

1. Biographical Data

1.A Name

KEREM PEKKAN

1.B Place and Date of Birth

Ankara, Turkey, August 5, 1970

1.C Education

Degree	Discipline	University	Date
B.S.	Mechanical Engineering	METU	1992
M.S.	Mechanical Engineering	METU	1995
Ph.D.	Mechanical Engineering	METU	2000

1.D Current and Former Positions

September 2014 – current

Associate Professor

Mechanical Engineering Department, Koc University, Istanbul - Turkiye

July 2011 – August 2015

Associate Professor

Biomedical Engineering Department, Carnegie Mellon University, Pittsburgh

July 2011 – July 2014

Associate Professor (courtesy)

Mechanical Engineering Department, Carnegie Mellon University, Pittsburgh

January 2007 – July 2011

Assistant Professor

Biomedical Engineering Department, Carnegie Mellon University, Pittsburgh

January 2007 – July 2011

Assistant Professor (courtesy)

Mechanical Engineering Department, Carnegie Mellon University, Pittsburgh

June 2005 – January 2007

Research Assistant Professor

Wallace H. Coulter Department of Biomedical Engineering,
Georgia Institute of Technology, Atlanta

September 2004 – June 2005

Research Engineer I

Wallace H. Coulter Department of Biomedical Engineering,
Georgia Institute of Technology, Atlanta

November 2002 – September 2004

Post Doctoral Fellow

Wallace H. Coulter Department of Biomedical Engineering,
Georgia Institute of Technology, Atlanta

November 2000 - November 2002

Research Associate

Mechanical Engineering Department, Purdue School of Engineering and Technology,
Indianapolis**October 1995 - November 2000**

Propulsion Research Engineer

Engineering Development Department,
Roketsan (Aerospace Industries Inc.), Turkiye**June 1992 - October 1995**

Teaching and Research Assistant

Mechanical Engineering Department, Middle East Technical University, Turkiye

June 1991 - August 1991

Undergraduate Research Fellow

Advanced Combustion Group

Defense Industries Research and Development Institute,
National Science Foundation of Turkey (Tubitak).**June 1990 - August 1990**

Undergraduate Research Fellow (Program for high honor students)

Research and Development Department, Aselsan Inc.

2. Teaching and Education**2.A Courses Taught**

	Course Title	Units	Class	Offered	Num of		Num	FCE	FCE
					Students		Resp	Crse	Instr
42-441	Cardiovascular (a)12 Mechanics		Fr	Fall 07	2		2	?	?
42-709	Biofluids (a)	12	Gr	Spring 08	10		6	3.5	3.5
42-709	Biofluids	12	Gr	Fall 08	6		5	4.5	4.6
42-441	Cardiovascular Mechanics	12	Fr	Spring 09	3		3	4.7	4.7
42-341	Introduction (a) to Biomechanics	9	Fr	Fall 09	11		8	2.8	3.1
42-709	Biofluids	12	Gr	Fall 08	5		4	4.5	4.8
42-341	Introduction to Biomechanics	9	Fr	Fall 10	12		8	3.3	3.3
42-201	Professional (a) Issues in Biomedical Engineering	3	Fr	Spring 11	56		41	4.4	4.2
42-697/24-619	Biofluids	6	Fr/Gr	Fall 13	12	8	4.4		4.3
42-201	Professional Issues in Biomedical Engineering	3	Fr	Fall 13	41		33	4.0	4.0
42-697	Special (a) Topics: Bio-inspired Engineering	6	Fr/Gr	Spring 14	12	8	3.5		3.5

42-201 Professional Issues 3 Fr Spring 14 30 22 4.5 4.5
in Biomedical Engineering

Spring 09, I have taught a full semester Journal Club course focusing on Biological Fluid Dynamics

	Course Title	Units	Class	Offered	Num of Students	Num Resp	FCE Crse	FCE Instr
18-222	Gas Dynamics	12	Gr	Fall 02	12	N/A	N/A	N/A
ME 466/566	Biomimetic Engineering Design and Analysis (a)	12	Fr/Gr	Spring 12	16	15	4.5	4.8
ME 491	Mechanical Engineering Design (a)	12	Fr	Fall 12	46	N/A	N/A	N/A
ME 408/508	Introduction to Biomechanics	12	Fr/Gr	Fall 12	15	14	4.7	4.8
ME 308/507	Finite Element Analysis (a)	12	Fr/Gr	Spring 13	19	18	4.6	4.8
ME 303	Machine Elements Analysis (a)	12	Fr	Fall 14	60	N/A	N/A	N/A
ME 451/551/BMSE 551	Biofluid Mechanics	12	Fr/Gr	Spring 15	N/A	N/A	N/A	N/A
ME 308/507	Finite Element Analysis	12	Fr/Gr	Spring 15	N/A	N/A	N/A	N/A
ME 408/508	Introduction to Biomechanics	28	Fr/Gr	Fall 15	N/A	N/A	N/A	N/A
ME 100	Introduction to Mechanical Engineering (a)	TBD	Fr	Spring 16	N/A	N/A	N/A	N/A

(a) New course

Spring 13, I taught full semester seminar course for grad students at BSME program

Spring 16, I will be teaching one-week module of “Quantitative Imaging” at University of Pittsburgh, as an *invited* Instructor

3.B Student Projects

(Completed class projects assigned to students are not included only research students)

(a) Undergraduate Projects

1. Ogun Oz, Parallelization of the in-house Cartesian grid CFD code, Spring 2015 – current
2. Naz Altekin, In vitro pulsatile test of cardiovascular devices, Fall 2014 - current
3. Damla Yenigul, Finite element analysis of cardiovascular networks for fMRI, Fall 2015 – current

4. Ece Tutsak, Hemodynamic sensitivity table for pre-term infants, Fall 2014 – current
5. Efe Temel, Spring network finite element code, Summer 2015
6. Can Taylan, Blood flow and torsional buckling modes of testicular artery, Fall 2014 - current
7. Ozgur Mahir and Murat Afsuroglu, Biaxial soft-tissue testing, Spring 2015 – Fall 2015
8. Cansu Karakaya, Quantitative PCR of embryonic arches, Spring 2014-Summer 2015
9. Fazil Uslu, Biomimetic applications of micro PIV (imaging cilia flow and dynamics), Spring 2012 – Spring 2015
10. Firat Atalay, Biological propulsion - CFD, Spring 2012 - Spring 2014
11. Fatma Coskun and Melis Enc, Embryonic aortic arch histology, Spring 2014 – Fall 2015
12. Duygu Cengiz, Cardiovascular Biology, Koc University Medical School, Spring 2012 – Spring 2014
13. Guncel Kirlangic, Open SIMM, Spring 2013
14. Brian Chang, 3D micro PIV red blood cell flow, Spring 2012 -Summer 2012
15. Soni Shephaly, Cardiovascular biology protocols for the embryonic arch vessels (Biology and Art), Spring 2011 - Spring 2012
16. Yixing Shi, Pediatric ECMO circuit blood damage problems (ChemE), Spring 2011 - Fall 2011
17. Doug Bernstein, Design of pediatric valved right ventricle conduit (MechE), Fall 2010 - current
18. Ming-yang Hung, PIV analysis of aneurysm models, Fall 2010-Fall 2011 (CIT Honors UG)
19. Shahroz Khalid, OCT image analysis (BME/ME), Fall 2010 - Fall 2011
20. Nick Teslovich, Cardiac development and cardiovascular biology studies in the chick embryo” (Biology), Spring 2010 - current
21. Phil Mannor, “RVOT valve in vitro modeling” (ME), Spring 2010-current
22. Alice Mayfield, “Cardiovascular surgical planning and RVOT models” (ME), Spring 2010-Fall 2010
23. Mikhail Lara, “Flow dynamics of the Hepatic Vein Junction via PIV” Carnegie Mellon, Fall 2009-Fall 2010. Supported through research credit. (ME) Currently PhD student at Penn State.
24. Nicholas Russell, “Cellular/nuclear subject-specific soft tissue finite element models” CIT-Honors undergraduate research student, Fall 2009-current
25. Christopher Lacko, “Computational and experimental modeling of non-traditional circulation systems, Summer 2008-Fall 2009
26. Mikhail Lara, “Ventricle assist device for Fontan patients,” Carnegie Mellon, Spring 2008-current. Supported through CMU-SURG award in 2009. (ME)
27. Kayhan Haj-Ali-Ahmadi, “3D anatomical reconstructions for surgical planning,” Carnegie Mellon, Summer 2007-Fall 2008. (Biology)
28. Dan Otoole, “Ventricle assist device for Fontan patients,” Carnegie Mellon, Summer 2007. (BME)
29. Vasu Yerneni “Computational fluid dynamics of congenital heart defects,” Georgia Tech, 2004-2006, Presidential Undergraduate Research Awardee, ASME/BMES

- 2004-06 meeting student papers and one journal article. Currently graduate student at Northwestern. (BME)
30. Paymon Nourperv, “Fetal hemodynamics,” Georgia Tech, 2004-2006, Presidential Undergraduate Research Awardee, ASME/BMES 2004-06 meeting student papers and one journal article. Currently at medical school working to be pediatric cardiac surgeon. (ME)
 31. Steven Valandingham, “CFD design of race cars,” received the undergraduate research award through his work, Indiana University Purdue University at Indianapolis, 2001 (ME)
 32. Supervised student project teams in experimental fluid dynamics turbomachinery and mechanical design 14 courses through 1992-1994, METU (ME, AE)
 33. Supervised ~10 co-op students and interns over five years (1995-2000), while working in industry (ME, AE)

(b) Master’s Students

1. Cansu Karakaya, Cardiovascular Biology, Fall 2015 - current
2. Berk Yigit, Lumped parameter modeling of fetal transition and chord clamping hemodynamics, Fall 2012 – Summer 2014 (continues as Research Associate)
3. Priti Abdal, “In vitro test system to study novel fenestration design for congenital heart surgery” Graduated Fall 2012.
4. Arush Karla, “Unsteady right ventricular valve 3D leaflet visualization” Graduated Fall 2012.
5. Aman Chawla, “Course based – Physics-based correction of cardiac perfusion scans” graduated Spring 2011.
6. Yajuan Wang, “Aortic arch morphogenesis and flow modeling in the chick embryo,” graduated Fall 2008, CMU
7. Umit Danis, “Optimizing bacterial propulsion,” graduated Spring 2009, CMU ME
8. Peng Liu, graduated Summer 2010, MS, (thesis committee member with Prof. E. Finol)
9. Co-supervised two research groups at Georgia Tech Biomedical Department, each having ~6 graduate students
10. Berrak Alparslan, “Unsteady wave-rotor propulsion,” AIAA Graduate Presentation Award, April 2001. Purdue (co-advised with Prof Razi Nalim)
11. Basar Seckin, “Propulsion Nozzle Design via Neural Network Optimization,” July 2001. METU (co-advised with Prof. Ahmet Ucer).

(c) Ph.D. Students

1. Fazil Emre Uslu, Tomographic PIV in bioinspired fluid mechanics, Fall 2015 - current
2. Samane Lashkarinia, Pre-surgical planning of cardiovascular patch implantation, Fall 2015 – current, BSME
3. Samir Donmezov, Cardiovascular Solid Mechanics - optimization of vessel constituents, Summer 2013 - current, ME
4. Gokce Nur Turkmen, Cardiovascular fluid mechanics, Fall 2014 - current, BSME
5. Sarmad Shams, Ventricle assist devices,

6. Daulet Izbassarov, “Computational analysis of viscoelastic droplets” Fall 2012 – current (Thesis committee member)
7. William Kowalski, “Embryonic cardiac morpho-mechanics,” Fall 2009 - Spring 2014. (CMU) currently Post Doc at Cardiovascular Research Institute at University of Louisville
8. Prahlad Menon, “In-house computational fluid dynamics solver improvement and application to cardiac development hemodynamics and biomimetic micro propulsion,” Summer 2010- Summer 2013. BME (Tenure-track faculty SYSU-CMU Joint Institute)
9. Onur Dur, “Patient-specific computational fluid dynamics and surgical planning optimization,” graduated Spring 2011, CMU/BME (employed at Thoratec Inc, CA)
10. Chia-Yuan Chen “Confocal micro particle image velocimetry and embryonic blood flow regulation via microfabrication,” Spring 2009 – Fall 2013, ME/BME (currently tenure track faculty at Taiwan)
11. Jinmo Lee, Spring 2011-Fall 2012 graduated, (thesis committee member with ME Prof. Donghyun You)
12. William Bromby, Spring 2011, (thesis committee member with ME Prof. Fred Higgs)
13. Dennis Trumble, “Development and Testing of a Muscle-powered Cardiac Assist Device” graduated Spring 2011 (thesis committee member with Prof. James Antaki)
14. Arielle Drummond, graduated Spring 2008. (thesis committee member with BME Prof. James Antaki) Present Position: Research Engineer, Circulite, USA.
15. Gail Siewiorek, graduated Spring 2010, “Hemodynamics of cloth capturing devices” (thesis committee member with Prof. E. Finol)
16. Rui Zhao, graduated Spring 2008, “Blood damage and platelet activation” (thesis committee member with Prof. James Antaki)
17. Christine Scotti (thesis committee member with ICES Prof. Ender Finol), “In vitro and in vivo dynamics of abdominal aortic aneurysms: a fluid-structure interaction study,” September 2007. Present Position: Research Engineer, SurgicalMedical, Technology Center, Arizona

(d) Post Doctoral Research Associates

1. Dr. Senol Piskin, Patient Specific Hemodynamic Surgical Planning, Summer 2013 - current, ME
2. Dr. Selda Goktas, Cardiovascular Tissue Engineering, Spring 2013 - current, ChemE
3. Dr. Volkan Tuncay, Cardiovascular Imaging and Pre-surgical planning, Fall 2015 – current, BME

3.C Educational Contributions (as of 2010)

Four new courses are developed. 4 invited class lectures at CMU and 1 at Pitt are presented (Spring 2009). 3 invited class lectures at CMU (Spring 2010), BMES Panel

Collaborators & Other Affiliations (partial list):

BB Keller; Univ of Louisville. C deGroff; University of Florida. A Robertson, B Roman, C Lo, D Vorp; Univ of Pittsburgh. F Sotiropoulos, Univ of Minnesota. J Antaki, A Acharya, M Sitti, P Leduc, B Ozdoganlar, LB Kara, H Choset, J Zhang Carnegie Mellon University. M Fogel, A

Undar; Penn State. K Kanter, Emory University. L Dasi; Colorado State, D Frakes, Arizona State Univ , D de Zelicourt; ETH, C Poelma; Delft University of Technology, S Vandenberghe; Bern University, E Finol Univ San Antonio, G Kassab Indiana Univ. M Sacks U Texas Austin. Diane de Zelicourt, ETHZurich, Emre Yaksi Leuven Belgium, A Yoganathan, J Rossignac; Georgia Tech.

Graduate Advisor: Middle East Technical University, Turkey: Ahmet Ucer (NATO-RTA director 2003-06)

Post-doc Mentors: Georgia Institute of Technology: Ajit Yoganathan, Purdue University: Razi Nalim

Spin-off Companies from Pekkan Lab

Cureistic (iTMC), App development for dental medicine, 2015

Hemodyn, interactive hemodynamic surgical planning, 2013

PecaLabs, medical device development for pediatric and rare diseases, 2012

Quant MD, is a healthcare startup dedicated to diagnosing coronary heart disease, 2012

4. Publications

4.A Books

1. Pekkan K, Piskin S, Hemodynamic cardiovascular surgical planning - a practical toolkit with open source tools, (*contract signed with Springer*), 2016/17
2. Goktas S, Chen CY, Kowalski WJ, Pekkan K. Hemodynamic Flow Visualization of Early Embryonic Great Vessels Using μ PIV, *Methods in Molecular Biology: Tissue Morphogenesis*, Editor Celeste Nelson, 1189:17-30, Springer, 2015

4.B Archival Papers Critically Reviewed Before Publication

1. Berg P, et.al. The Computational Fluid Dynamics Rupture Challenge 2013 - Phase II: Variability of Hemodynamic Simulations in Two Intracranial Aneurysms, *Journal of Biomechanical Engineering*, doi: 10.1115/1.4031794, 2016
2. Donmezov S, Piskin S, Pekkan K, Non-invasive in vivo determination of residual strains and stresses, *Journal of Biomechanical Engineering*, 137(6): 061011, 2015 (corresponding author)
3. Lindsey SE, Menon PG, Kowalski WJ, Shekhar A, Butcher JT, Pekkan K, Growth and hemodynamics after early embryonic aortic arch occlusion, *Biomechanics and Modeling in Mechanobiology*, 14(4): 735-51, 2015 (corresponding author)

4. Yigit B, Kowalski W, Hutchon D, Pekkan K, Transition from the fetal to neonatal circulation: Modeling the effects of umbilical cord clamping, *Journal of Biomechanics*, 48(9):1662-70, 2015 (corresponding author)
5. Alkan-Bozkaya T, Ozyüksel A, Salihoğlu E, Haydın S, Tanyıldız M, Pekkan K, Hatemi A, Türköz A, Erkan H, Aydın S, Kahraman A, Savaş A, Ersoy C, Türkoğlu H, Ündar A and Akçevin A, Eight Istanbul Symposium on Pediatric Extracorporeal Life Support Systems and Pediatric Cardiopulmonary Perfusion, 39(5):E49-55, Invited Editorial, *Artificial Organs*, 2015
6. Piskin S, Undar A, Pekkan K, Neonatal cardiopulmonary bypass hemodynamics with detailed Circle of Willis anatomy, in press, *Artificial Organs*, 39(10):E164-75, 2015 (corresponding author)
7. Ündar A, Ravishankar C, Wang S, Pekkan K, Akçevin A, Luciani GB, Outcomes of the tenth international conference on pediatric circulatory support systems and pediatric perfusion, *Artificial Organs*, 39(1):1-6, 2015 (Guest Editorial)
8. Antón R, Chen CY, Hung M, Menon PG, Patrick MJ, Finol EA, Pekkan K, Experimental and Computational Investigation of the Patient-Specific Abdominal Aortic Aneurysm Pressure Field, *Computer Methods in Biomechanics and Biomedical Engineering*, 18(9):981-992, 2015
9. Kowalski W, Pekkan K, Keller BB, Investigating Developmental Cardiovascular Biomechanics and the Epigenetic Origins of Congenital Heart Defects, *Frontiers in Physiology*, in Mechanotransduction and Development of Cardiovascular Form and Function, Editor Linask and Watanabe, 5:408, 2014.
10. Yap CH, Liu X, Pekkan K, Characterization of the vessel geometry, flow mechanics and wall shear stress in the great arteries of wild-type mouse embryo, *PlosONE*, 9(1):e86878, 2014 (corresponding author)
11. Chen CY, Antón R, Hung M, Menon PG, Patrick MJ, Finol EA, Pekkan K, Effect of intraluminal thrombus on patient-specific abdominal aortic aneurysm hemodynamics via stereoscopic PIV and CFD modeling, *Journal of Biomechanical Engineering*, 136(3):031001, 2014 (corresponding author)
12. Kowalski W, Dur O, Teslovich N, Wang Y, Keller B, Pekkan K, Left atrial ligation alters intracardiac flow patterns and the biomechanical landscape in the chick embryo, *Developmental Dynamics*, 243(5):652-62, 2014 (corresponding author)
13. Ündar A, Wang S, Palanzo D, Weaver B, Pekkan K, Agirbasli M, Zahn JD, Luciani GB, Sano S, and Belli E. Outcomes of the ninth international conference on pediatric mechanical circulatory support systems and pediatric cardiopulmonary perfusion, *Artificial Organs* 2014; 38 (1)
14. Menon PG, Antaki JF, Undar A, Pekkan K, Aortic Outflow Cannula Tip Design and Orientation Impacts Cerebral Perfusion During Pediatric Cardiopulmonary Bypass Procedures, *Annals of Biomedical Engineering*, 41(12):2588-602, 2013 (corresponding author)
15. Chen C, Pekkan K, High-speed three-dimensional characterization of fluid flows induced by micro-objects in deep micro-channels, *Biochip Journal*, 7(2): 95-103, 2013
16. Kowalski W, Dur O, Wang Y, Patrick M, Tinney J, Keller B, Pekkan K, Critical transitions in early embryonic aortic arch patterning and hemodynamics, *PlosONE*, 8(3): e60271, 2013

17. Hong H, Dur O, Zhang H, Zhu Z, Chen H, Pekkan K, Liu J, Patient-specific hemodynamic performance of Fontan conversion templates: Lateral tunnel vs. intra-atrial with fenestration, (joint lead and corresponding authors), *Pediatric Cardiology*, 34(6):1447-54, 2013
18. Chen C, Menon PG, Kowalski W, Pekkan K, Time-resolved OCT- μ PIV: A new microscopic PIV technique for noninvasive depth-resolved pulsatile flow profile acquisition, *Experiments in Fluids*, 54:1426, 2013
19. Pasta S, Chod J, Dur O, Pekkan K, Vorp DA, Computer modeling for the prediction of thoracic aortic stent graft collapse, *Journal of Vascular Surgery*, 57(5):1353-61, 2013
20. Menon PG, Teslovich N, Chen CY, Undar A, Pekkan K. Characterization of neonatal aortic cannula jet flow regimes for improved cardiopulmonary bypass, 46(2):362-72, *Journal of Biomechanics*, 2013
21. Menon PG, Yoshida M, Pekkan K, Pre-Surgical Evaluation of Fontan Connection Options for Patients with Apicocaval Juxtaposition using Computational Fluid Dynamics, 37(1):E1-8, *Artificial Organs*, 2013
22. Steinman D. et. al. Variability of CFD Solutions for Pressure and Flow in a Giant Aneurysm: The SBC2012 CFD Challenge, *Journal of Biomechanical Engineering*, 135(2):021016, 2013
23. Albal PG, Menon P, Kowalski W, Undar A, Turkoz R, Pekkan K, Novel fenestration designs for controlled venous flow shunting in failing Fontans with systemic hypertension, *Artificial Organs*, 37(1):66-75, 2013
24. Yoshida M, Menon P, Pekkan K, Chrysostomou C, Wearden PD, Oshima Y, Okita Y, Morell V, Total cavopulmonary connection for patients with apicocaval juxtaposition: Consideration about the optimal route of conduit using preoperative angiography and flow simulation, 44(1): e46-52, *European Journal of Cardiovascular Surgery*, 2013
25. Pekkan K, Keller B, Fetal and Embryonic Hemodynamics: Developmental Fetal Cardiovascular Biomechanics in the 21st Century: Another Tipping Point, Guest Editorial for Special Issue, *Cardiovascular Engineering and Technology*, Vol. 4, No. 3, pp. 231–233, DOI: 10.1007/s13239-013-0152-8, 2013
26. Ündar A, Akçevin A, Alkan-Bozkaya T, Bakır I, Pauliks L, Palanzo D, Durandy Y, Ersayin-Kantas H, Ravishankar C, Gruenwald CE, Sandica E, Sun K, Türköz R, Pekkan K, Ceyran H, Weaver B, Pierce WS, Myers JL, Outcomes of the Eighth International Conference on Pediatric Mechanical Circulatory Support Systems and Pediatric Cardiopulmonary Perfusion, *Artificial Organs*, 37(1):1-9, 2013.
27. Roman B, Pekkan K, Mechanotransduction in embryonic vascular development, *Biomechanics and Modeling in Mechanobiology*, 11(8):1149-68, 2012
28. Zelicourt D, Jung P, Horner M, Pekkan K, Kanter KR, Yoganathan AP, Cannulation strategy for aortic arch reconstruction using deep hypothermic circulatory arrest, *Annals of Thoracic Surgery*, 94(2):614-20, 2012
29. Sundareswaran KS, Haggerty CM, de Zélicourt D, Dasi LP, Pekkan K, Frakes DH, Powell AJ, Kanter KR, Fogel MA, Yoganathan AP, Visualization of Flow Structures in Fontan Patients Using Three-Dimensional Phase Contrast Magnetic Resonance Imaging, *Journal of Thoracic and Cardiovascular Surgery* 143(5): 1108-16, 2012
30. Koçyıldırım E, Dur O, Soran O, Tüzün E, Miller MW, Housler GJ, Wearden PD, Fossum TW, Morell VO, Pekkan K. Pulsatile venous waveform quality in Fontan

- circulation-clinical implications, venous assists options and the future. *Anatolian Cardiology Journal*, 12, Issue: 5, 420-6, 2012
31. Kowalski WJ, Teslovich NJ, Dur O, Keller BB, Pekkan K, Computational hemodynamic optimization predicts dominant aortic arch selection is driven by embryonic outflow tract orientation in the chick embryo, *Biomechanics and Modeling in Mechanobiology*, 11(7):1057-73, 2012 (senior/corresponding author)
 32. Undar A, Alkan-Bozkaya T, Palanzo D, Ersayin-Kantas H, Chin C, Odemiş E, Pekkan K, Ağırbaşlı MA, Türköz A, Türköz R, Haydin S, Erek E, Yalçınbaş YK, Saşmazel A, Karacı AR, Erkan H, Cicek AE, Bakır I, Sarioğlu T, Akçevin A, Aytaç A. Istanbul Symposium on Neonatal and Pediatric Cardiopulmonary Bypass Procedures. *Artif Organs*, 36(5):463-466, 2012
 33. Dur O, Kocylidirim E, Soran O, Wearden P, Morell V, DeGroff CG, Pekkan K, Pulsatile venous waveform quality affects the conduit efficiency in functional and “failing” Fontan circulations, *Cardiology in the Young*, 22(3):251-62, 2012 (senior/corresponding author)
 34. Menon PG, Madan S, Pekkan K, Quantitative Hemodynamic Evaluation in Children with Coarctation of Aorta: Phase Contrast Cardiovascular MRI versus Computational Fluid Dynamics. Published in Springer LNCS (Lecture Notes in Computer Science) series #7746. Presented at the '2012 International Workshop on Statistical Atlases and Computational Models of the Heart' at the 15th International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI), Nice, France. 1-5 October 2012.
 35. Lara M, Chen CY, Mannor P, Dur O, Menon PG, Yoganathan AP, Pekkan K. Hemodynamics of the hepatic venous three-vessel confluences using particle image velocimetry, *Annals of Biomedical Engineering*, 39(9):2398-416, 2011(senior/corresponding author)
 36. Corti P, Young S, Chen CY, Patrick MJ, Rochon ER, Pekkan K, Roman BL., Interaction between alk1 and blood flow in the development of arteriovenous malformations, *Development*. 138(8):1573-82, 2011
 37. Chen CC, Patrick MJ, Corti P, Kowalski W, Roman BL, Pekkan K, Analysis of early embryonic great-vessel microcirculation in zebrafish using high-speed confocal μ PIV, *Biorheology*, 48(5):305-21, 2011
 38. Dur O, Coskun T, Kara B, Pekkan K. Computer-aided patient-specific coronary artery graft design improvements using CFD coupled shape optimizer, *Cardiovascular Engineering and Technology*, 2(1); 35-47, 2011 (senior/corresponding author) **Notable Paper:** Patient-specific coronary bypass pre-surgical planning; The introduction of CMU sketch-based interactive computer-aided hemodynamic planning tool. New technology compared to my 2008 first-author publication (see Paper 21 below).
 39. Yoshida M, Wearden PD, Dur O, Pekkan K, Morell VO, Right ventricular outflow tract reconstruction with bicuspid valved polytetrafluoroethylene conduit, *Annals of Thoracic Surgery*, 91(4):1235-9, 2011
 40. Patrick MJ, Chen C, Frakes DH, Dur O, Pekkan K, Cellular level near-wall unsteadiness of high-hematocrit erythrocyte flow using confocal microPIV, *Experiments in Fluids*, 50(4): 887-904, 2011 (senior/corresponding author) **Notable Paper:** Two-phase experimental flow measurements using confocal microscopy

- published in a major fluid mechanics journal. The exciting prospect of noninvasive red blood cell damage measurements at the turbulent cardiovascular device flow conditions is demonstrated first time in literature.
41. Dasi LP, Whitehead K, Pekkan K, de Zelicourt D, Sundareswaran K, Kanter K, Fogel MA, Yoganathan AP. Pulmonary hepatic flow distribution in total cavopulmonary connections: Extracardiac versus intracardiac. *J Thorac Cardiovasc Surg*. 141(1):207-14, 2011
 42. Dahl KN, Kalinowski A, Pekkan K, Mechanobiology and the microcirculation: cellular, nuclear and fluid mechanics. *Microcirculation*. 17(3):179-91, 2010
 43. Dur O, Yoshida M, Manor P, Mayfield A, Wearden PD, Morell VO, Pekkan K, In vitro evaluation of right ventricular outflow tract reconstruction with bicuspid valved polytetrafluoroethylene conduit, *Artificial Organs*, 34(11):1010-6, 2010 (senior/corresponding author) **Notable Paper:** This study demonstrates the independent in vitro engineering analysis of a unique intra-operatively manufactured pediatric right-ventricular outflow heart valve. Our improved designs are being implanted in patients.
 44. Kim Y, Pekkan K, Messner WC, Leduc PR, Three-dimensional chemical profile manipulation using two-dimensional autonomous microfluidic control, *J Am Chem Soc*. 132(4):1339-47, 2010 (My biofluid class course project)
 45. Dur O, DeGroff C, Brad B. Keller, Pekkan K, Optimization of Inflow Waveform Phase-Difference for Minimized Total Cavopulmonary Power Loss, 132, 031012, *ASME Journal of Biomechanical Engineering*, 2010 (senior/corresponding author) **Notable Paper:** A novel hydrodynamic optimization modality is introduced first time in literature and applied to the multi-inlet pediatric surgical reconstructions. Waveform optimization is based on the relative phase-angle shift of synchronized inflows and produces equivalent hemodynamic improvement as the traditional surgical pathway shape optimization.
 46. Dasi LP, de Zelicourt D, Sundareswaran KS, Pekkan K, Yoganathan AP. Why Fontan's fail? 139:1673-1674, *Journal of Thoracic and Cardiovascular Surgery*, 2010 (invited editorial reply)
 47. Dur O, Lara M, Vandenberghe S, Keller B, Pekkan K, Pulsatile in vitro simulation of the pediatric uni-ventricular circulation for evaluation of cardiopulmonary assist scenarios, 33(11):967-76, 2009, *Artificial Organs*, 2009 (senior/corresponding author)
 48. Undar A, Pauliks L, Clark J, Zahn J, Rosenberg G, Kunselman AR, Sun Q, Pekkan K, Saliba K, Carney E, Thomas N, Freeman W, Vrana K, El-Banayosy A, Ural S, Wilson R, Umstead T, Floros J, Phelps D, Weiss W, Snyder A, Yang S, Kimatian S, Cyran S, Chinchilli V, Guan Y, Rider A, Haines N, Rogerson A, Alkan-Bozkata T, Akcevin A, Sun K, Wang S, Cun L, Myers J, Penn State Hershey - International center for pediatric cardiovascular research, *Artificial Organs*, 33(11), 2009
 49. Wang Y, Dur O, Patrick M, Tinney J, Tobita K, Keller BB, Pekkan K, Aortic arch morphogenesis and flow modeling in the chick embryo, *Annals of Biomedical Engineering*, 37(6):1069-81, 2009 (senior/corresponding author) **Notable Paper:** First major paper as senior/corresponding author. This study investigates the hemodynamic loading during very early aortic arch development in the chick using CFD and micro-CT first time in literature. Early embryonic aortic arch is observed to be a complex dynamic great-vessel manifold.

50. Dasi LP, Krishnankuttyrema R, Kitajima HD, Pekkan K, Sundareswaran KS, Fogel M, Sharma S, Whitehead K, Kanter K, Yoganathan AP, Fontan hemodynamics: importance of pulmonary artery diameter. *Journal of Thoracic and Cardiovascular Surgery*, 137(3):560-4, 2009
51. Dasi LP, Pekkan K, de Zelicourt D, Sundareswaran KS, Krishnankutty R, Delnido PJ, Yoganathan AP. Hemodynamic energy dissipation in the cardiovascular system: generalized theoretical analysis on disease states. *Annals of Biomedical Engineering*, 37(4):661-73, 2009
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Review Process: Anonymous peer review of complete manuscript prior to acceptance.

4.D Other Papers in Symposium or Conference Proceedings

Goktas S, Karakaya C, Karahuseyinoglu S, Pekkan K. Histological and Genetic Investigation of the Microvascular Great Artery Morphogenesis. European ISACB Meeting, Nuremberg, Germany, December 3-4 2015

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Senol Piskin, Yusuf Yalcinbas, Tayyar Sarioglu, Kerem Pekkan, Computational Modeling of First-Stage Shunt Hemodynamics: Novel Shunt Configurations, Diameter and Cerebral Great Vessels, 4th International Conference on Engineering Frontiers in Pediatric and Congenital Heart Disease, Paris, France, 2014

Kowalski W, Teslovich N, Chen C, Keller B, Pekkan K, Simultaneous real-time quantification of blood flow and vascular growth in the chick embryo using optical coherence tomography, Optical Methods in Developmental Biology II, BiOS, Photonic West 2014, 1 - 6 February 2014 The Moscone Center San Francisco, California, United States, 2014

Pekkan K, Senol P, Progress in Computational Modeling of Neonatal Cardiopulmonary Bypass Hemodynamics with Detailed Circle of Willis Anatomy, 10th International Conference on Pediatric Mechanical Circulatory Support Systems & Pediatric Cardiopulmonary Perfusion, University of Pennsylvania, Philadelphia, PA, May 28-31, 2014

Chen CY, Pekkan K, Three-dimensional (3D) characterization of fluid flows induced by microobjects in microfluidics, 10th International Symposium on Particle Image Velocimetry, Delft University, the Netherlands, July 1-3, 2013

Piskin S, Dur O, Pekkan K, Blood Flow in Realistic Neonatal Aorta using Open Source Software OpenFOAM, 8th International OpenFoam Workshop, Jeju, Korea, June 11- 14, 2013

M. B. Yigit, W. Kowalski, D.J.R. Hutchon, K. Pekkan, "Lumped parameter circulation model of umbilical cord clamping" International Conference on Transitional Care, University of Birmingham, Birmingham, United Kingdom. April 19, 2013

Yigit B, Sasmazel A, Karaci AR, Pekkan K, Yekele I, Computational analysis of maternal oxygen therapy on transverse aorta growth for hypoplastic left heart syndrome, 12th Ulusal Pediatrik Kardiyoloji ve Kalp Cerrahi Kongresi, Fethiye, Turkey, May 2013

Bernstein D, Pekkan K, Yoshida M, PECA Labs: A valved RV-PA conduit for hypoplastic left heart syndrome, Atlanta Pediatric Device Consortium, Pediatric Device Workshop and Competition, August 10, 2012

Kowalski WJ, Dur O, Wang Y, Tinney J, Keller B, Pekkan K Hemodynamics of the Transitional Aortic Arch Patterning at a Key Embryonic Stage, International Society of Cardiovascular Biology Meeting, 2012, London

Menon, P.G, Undar A, Pekkan K, "Computational evaluation and in silico testing of a novel aortic outflow cannula designed for pediatric cardiopulmonary bypass procedures." Oral presentation in BMES 2012 Annual Meeting, Atlanta, GA. October 24-27, 2012

Chen C, Menon PG, Kowalski W, Pekkan K Characterization of in vivo hemodynamics using micro-particle image velocimetry (μ PIV, 14th International Congress of Biorheology and 7th International Conference on Clinical Hemorheology. 2012

Prahlad G.Menon, Kerem Pekkan, "Pre and Post Surgical Evaluation of Patient-Specific Total Cavopulmonary Connections, using Computational Fluid Dynamics." The 3rd Annual Conference on Engineering Frontiers in Pediatric and Congenital Heart Disease, Stanford, CA (USA) May 1- 2, 2012.

Pasta S, Dur O, Pekkan K, Vorp DA, Cho JS, Computer Modeling for the Prediction of Thoracic Aortic Stent Graft Collapse, Journal of Vascular Surgery, Volume 54, Issue 3, Page 925, 2011 (Eastern Vascular Society Annual Meeting)

Prahlad G. Menon, Akif Undar, Fotis Sotiropoulos, Kerem Pekkan, Device specific analysis of neonatal aortic outflow cannula jet flows regimes for improved cardiopulmonary bypass hemodynamic performance, Computational Fluid Dynamics (CFD) in Medicine and Biology in conjunction with the Seventh International Biofluid Mechanics Symposium, March 25-30, 2012, Ein Bokek, Dead Sea, Israel

William J. Kowalski, Prahlad G. Menon, Nikola C. Teslovich, Onur Dur, Bradley B. Keller, Joseph P. Tinney, Kerem Pekkan, Computational fluid dynamics investigation of altered blood flow patterns leading to reduced left ventricular growth in hypoplastic left heart syndrome, Computational Fluid Dynamics (CFD) in Medicine and Biology in conjunction with the Seventh International Biofluid Mechanics Symposium, March 25-30, 2012, Ein Bokek, Dead Sea, Israel

Teslovich N, Kowalski W, Tinney J, Keller BB, Pekkan K, Altered intracardiac flow patterns in the left atrial ligated chick embryo, BMES Annual Meeting, October 12–15, 2011; Connecticut Convention Center, Hartford, Conn.

Menon GP, Undar A, Thrumble D, Pekkan K, Computational fluid dynamics characterization of neonatal cardiopulmonary by-pass cannula outflow jets for improved hemodynamic performance, BMES Annual Meeting, October 12–15, 2011; Connecticut Convention Center, Hartford, Connecticut.

Prahlad G. Menon, Mark Doyle, Robert W.W. Biederman, Kerem Pekkan, High throughput physics based image analysis of cardiac MRI perfusion and function for spatial localization of myocardial ischemia, 5th WACBE World Congress on Bioengineering, August 18-21, 2011, Taiwan.

Bernstein D, Dur O, Yoshida M, Pekkan K, Optimizing a Bicuspid-Valved PTFE Conduit for Pediatric RVOT Reconstruction, 2011 Northeast Bioengineering Conference, Senior UG design competition poster and presentation, Rensselaer Polytechnic Institute, April 2011.

Kowalski W, Teslovich N, Dur O, Keller B, Pekkan K, Characterization of the Outflow Tract-Aortic Arch Angle During Embryonic Development in the Chick, 2010 BMES Annual Fall Meeting, Austin, OP-7-2-8D

Kowalski W, Dur O, Pekkan K, Lumped Parameter Model for the Measurement of O₂ and CO₂ Concentration in Congenital Heart Defects, 2010 BMES Annual Fall Meeting, Austin, OP-7-2-8F

Yoshida M, Dur O, Wearden PD, Pekkan K, Morell VO, In Vitro Simulation and Clinical Results of Bicuspid Valved PTFE Conduit for Right Ventricular Outflow Tract 63rd Annual Scientific Meeting of the Japanese Association for Thoracic Surgery, June 2010.

Plasencia J, Babiker H, Richardson R, Rhee E, Willis B, Nigro J, Cleveland D, Pekkan K, Frakes DH. Simulation of surgical modification and post-operative flow for Tetralogy of Fallot repair, 1st International Conference on Computational Simulation in Congenital Heart Disease, University of San Diego, Feb 24-25, 2010 (First place at the 2010 mimics innovation awards competition)

Dur O, DeGroff CG, Keller BB, Frakes D, Pekkan K, Bioengineering approaches and insights for the optimized management of single ventricle physiology, 1st International Conference on Computational Simulation in Congenital Heart Disease, University of San Diego, Feb 24-25, 2010

Dur O, DeGroff CG, Keller BB, Pekkan K, Characterization of pulsatile venous flow hemodynamics inside total cavopulmonary connection, 1st International Conference on Computational Simulation in Congenital Heart Disease, University of San Diego, Feb 24-25, 2010

Kim J, Dur O, Antaki JF, Pekkan K, FSI Simulation to aid Surgical Planning of Fontan Palliation, BMES Meeting, Pittsburgh, PA, October 7-10, 2009

Dur O, Wang Y, Patrick MJ, Tinney J, Keller BB, Pekkan K, Correlation of wall shear stress and pharyngeal arch lumen diameter during early embryonic development in the chick, BMES Meeting, Pittsburgh, PA, October 7-10, 2009

Lara M, Dur O, Pekkan K, Fluid Dynamic Assessment of Hepatic Venous Flow Using Digital Particle Image Velocimetry, BMES Meeting, Pittsburgh, PA, October 7-10, 2009

Dur O, Lacko C, Kocyildirim E, Wearden PD, Soran OZ, Keller BB, DeGroff C, Pekkan K, Pulsatile Efficiency of Mechanical Assist Scenarios in Failing Fontan Patients, BMES Meeting, Pittsburgh, PA, October 7-10, 2009

Pekkan K, Dur O, Wang Y, Patrick MJ, Kara L, Tinney J, Keller BB, Experimental and Computational Fluid Dynamic Analysis of Aortic Arch Configurations in the Chick Embryo, BMES Meeting, Pittsburgh, PA, October 7-10, 2009

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Haggerty CM, de Zelicourt DA, Sundareswaran KS, Pekkan K, Fogel MA, Yoganathan AP, Hemodynamic Assessment of Virtual Surgery Options for a Failing Fontan Using Lumped Parameter Simulation, Computers in Cardiology Meeting, Park City, Utah, USA, September 13-16, 2009

Dur O, Coskun ST, Coskun KO, Kara LB, Pekkan K, Hemodynamics of Sequential Coronary Bypass Grafting Configurations via Sketch-Based Surgical Planning Tool, Fifth International

Conference on Pediatric Mechanical Circulatory Support Systems and Pediatric Cardiopulmonary Perfusion, May 27-30, 2009, Dallas, Texas.

Danis U, Sitti M, Pekkan K, Particle image velocimetry and thrust of flagellar micro propulsion systems, 61st Annual Meeting of the APS Division of Fluid Dynamics, November 23–25, 2008; San Antonio, Texas

Dur O, DeGroff G, Sundareswaran K, Yoganathan A, Pekkan K, Optimization of Power Loss Inside TCPC via Caval Flow Waveforms Based on Patient Specific MRI Data, 2008 BMES Annual Fall Meeting, St. Louis.

R. Payli, Pekkan K, "High Performance Clinical Computing on the TeraGrid: Patient-Specific Hemodynamic Analysis and Surgical Planning," presented at the TeraGrid 2007 Conference Madison, WI, 2007.

Pekkan K, DeGroff CG, Arnold DK, Hund SJ, Antaki JF, Wearden P, Keller BB, Borovetz H, Webber S, "Right Ventricular Venous Assist Device Strategies for the Pediatric Single Ventricle Patients with "Failed" Fontan Circulation" Gordon Research Conference on Assisted Circulation: Mechanical Circulatory Support: Moving The Field Forward, August 19-24, 2007, Big Sky Resort, Big Sky, MT

Pekkan K, Dur O, Kanter K, Sundareswaran K, Fogel M, Yoganathan A, Ündar A. "Neonatal Aortic Arch Hemodynamics and Perfusion during Cardiopulmonary Bypass." Third International Conference on Pediatric Mechanical Circulatory Support Systems and Pediatric Cardiopulmonary Perfusion, May 19-22, 2007, Hershey, Pennsylvania.

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Jarek Rossignac, Kerem Pekkan, Diane de Zelicourt, Brian Whited, Kirk Kanter, Shiva Sharma, Ajit Yoganathan, New Tools for Interactive Patient-Specific Cardiovascular Surgical Planning, American International Conference on Medical and Biological Engineering, AIMS in BioDesign, Atlanta, September 2006

Kerem Pekkan, Diane de Zelicourt, Kartik Sundareswaran, Jorge Himenez, Carol Lucas, Ajit Yoganathan, Preliminary design of cardiovascular devices using lumped parameter modeling, American International Conference on Medical and Biological Engineering, AIMS in BioDesign, Atlanta, September 2006.

de Zelicourt D., Sundareswaran K.S., Pekkan K. et al. Surgical planning of the total cavopulmonary connection using MRI, computational and experimental fluid dynamics. American International Conference on Medical and Biological Engineering, AIMS in BioDesign, Atlanta, September 2006

David H. Frakes, Kerem Pekkan, Lakshmi P. Dasi, Robert Binnion, Mark J. T. Smith, Ajit P.

Yoganathan, A New Adaptive Method for Registration-Based Medical Image Interpolation, The 12th International Conference on Biomedical Engineering, December 7-10 2005, Singapore.

Pekkan K., Zelicourt D, Sorensen D, Kitajima H, Yoganathan A.P., “CFD Aided Surgical Design in Complex Congenital Diseases” GTEC Educational Partnership Symposium, Atlanta, GA, October 7-14, 2004.

Chaikof E. L., Kasirajan K., Pekkan K., Frakes D. H., Milner R, Dodson T. F., Yoganathan A. P., “Non-Invasive Analysis of Aortic Dissection Fluid Dynamics” Southern Association of Vascular Surgery, 29th Annual Meeting, Marco Island, Florida, January 19-22, 2005.

Erek E., Pekkan K., Yalçınbaş Y., Salihoğlu E., Sarıoğlu T., Biliflet Mitral Kapak Prolapsusuna Bagli Mitral Kapak Yetersizliginin Cerrahi Olarak Duzeltilmesinde Yeni Bir Yontem: Mitral Ag Aparati, (in vitro calisma), Turk Kalp Damar Cerrahisi Dernegi 8.Ulusal Kongresi, 1-5 Eylul 2004, Kapadokya, Turkiye. (*In Turkish: A new method for the surgical repair of bileaflet mitral valve prolapse: Mitral Web Device, Turkish Society of Cardiothoracic Surgery*)

Yerneni V., Pekkan K., Kim D., Yoganathan A.P., *Pulmonary artery flow control in congenital diseases with nozzle shaped expandable stents*, Biomedical Engineering Society (BMES) Annual Fall Meeting, Philadelphia, PA, October 13-16 2004, (participated to the undergraduate contest).

Ge L., Gilmanov A., Carberry J, Pekkan K., Sotiropoulos F., Yoganathan A. P, *Toward a Predictive CFD Framework for Multi-Scale Cardiovascular Flow Simulations*, Biomedical Engineering Society (BMES) Annual Fall Meeting, Philadelphia, PA, October 13-16 2004.

Gilmanov A, Ge L, Wang C, Zelicourt D, Pekkan K, Sotiropoulos F, Yoganathan A P, Numerical Simulation of Flow in Anatomically Realistic Total Cavo-Pulmonary Connections Using Boundary Immersed Methods, APS Division of Fluid Dynamics 57th Annual Meeting, 2004.

Ge L., Pekkan K., Leo H. L., Zelicourt D., Sotiropoulos F., Yoganathan P. A, “Numerical Modeling of Cardiovascular Flows: Integrating High Resolution CFD & Experimental Techniques” 21st International Congress of Theoretical and Applied Mechanics (ICTAM04), Warsaw, 15-21 August 2004

Yoganathan A. P, Frakes D., Kitajima H., Soerensen D., Sundareswaran K., Pekkan K., Sotiropoulos F., Zélicourt D., Flow Dynamics of the Anatomic TCPC: An Integrated MRI, In Vitro Experimentation, and CFD Approach for Surgical Applications, International Interdisciplinary Workshop on Flow and Motion, ISMRM, University Hospital Zurich, 2004.

Ge, L., Pekkan, K., Leo, H-L., Sotiropoulos, F., de Zelicourt, D. and Yoganathan, A.P. A Pragmatic Approach Towards Accurately Modeling Cardiovascular Flows: Integrating High Resolution Computational Fluid Dynamics & Sophisticated Experimental Techniques. International Conference on Mathematical Biology, Kanpur, India, February 2004.

Ge L., Pekkan K., Leo H. L., Zelicourt D., Sotiropoulos F., Yoganathan P. A, “Toward Quantitatively Accurate Modelling of Cardiovascular Flows: Integrating High Resolution CFD

& Experimental Techniques” US National Committee on Biomechanics, International Bio-Fluids Symposium and Workshop December, Caltech, Pasadena, 12-14, 2003 (*invitation only*).

Nalim R., Pekkan K., *Internal Combustion Wave Rotors for Gas Turbine Engine Enhancement*, Tokyo International Gas Turbine Congress, November 2-7, 2003, IGTC2003-ABS-146.

Zelicourt D. A., Frakes D. H., Pekkan K., Yoganathan A. P., *Construction of Morphologically Accurate TCPC Models for In Vitro Flow Studies*, 1st National Symposium on Frontiers in Biomechanics, Nashville, TN, October 1 2003.

Zelicourt D. A., Pekkan K., Yoganathan A. P., *Fluid Dynamic Analysis of an Anatomic Total Cavopulmonary Connection*, Biomedical Engineering Society (BMES) Annual Fall Meeting, Nashville, TN, October 1-4 2003.

4.E Sections or Chapters in Edited Monographs or Similar Volumes

4.F Published Abstracts, Discussions, Reviews

Goktas S, Pekkan K. Mechanotransduction in Early Embryonic Growth and Remodeling of Great Arteries. EMBO Winter Retreat, Ankara, Turkey, January 16-17 2015.

Goktas S, Pekkan K. Yenidogan ve Cocuk Kalp Damar Hastalarında Kullanılacak Biyolojik ve Mekanik Uyumlu Yamaların Üretilmesi. IGB-Izmir Genom Konferansı, Izmir, Turkey, April 20, 2015.

Yigit MB, Pekkan K, Lumped parameter hemodynamics of non-traditional circulation systems, 19th Congress of the European Society of Biomechanics, August 25-28, 2013. Patras, Greece. (to appear in Journal of Biomechanics)

Kerem Pekkan, " Impact of Computational Fluid Dynamics on Pediatric CPB Procedures " 9th International Conference on Pediatric Mechanical Circulatory Support Systems and Pediatric Cardiopulmonary Perfusion (Oral Presentation and Panel Moderator), Hershey, Pennsylvania, May 8-13, 2013.

Kerem Pekkan, Novel Neonatal Cannula Design, 9th International Conference on Pediatric Mechanical Circulatory Support Systems and Pediatric Cardiopulmonary Perfusion (Oral Presentation and Panel Moderator), Hershey, Pennsylvania, May 8-13, 2013.

Chen CY, Chang BY, Holzman R, Pekkan K, Feeding flow dynamics of developing zebrafish larvae, APS Division of Fluid Dynamics 65th Annual Meeting, San Diego, 2012 (Gallery of Fluid Motion Poster)

Prahlad G.Menon, Masahiro Yoshida, Kerem Pekkan, "Pre-Surgical Evaluation of Fontan Connection Options for Patients with Apicocaval Juxtaposition, using Computational Fluid

Dynamics," 8th International Conference on Pediatric Mechanical Circulatory Support Systems and Pediatric Cardiopulmonary Perfusion (Oral Presentation), Istanbul, Turkey, June 13-16, 2012.

Prahlad G. Menon, Akif Undar, Fotis Sotiropoulos, Kerem Pekkan, Device specific analysis of neonatal aortic outflow cannula jet flows for improved cardiopulmonary bypass hemodynamics, 64th Annual Meeting of the APS Division of Fluid Dynamics, Baltimore, November 20-22, 2011

Kocylidirim E, Dur O, Soran O, Tuzun E, Wearden P, Morell V, K. Pekkan, Pulsatile venous waveform quality in Fontan circulation – clinical implications, venous assist options and the future, Third Scientific Meeting World Society for Pediatric and Congenital Heart Surgery June 23-26, 2011, Istanbul, Turkey

Pekkan K, Kowalski W, Dur O, Kara B, Keller B, Sotiropoulos F, Early embryonic intra-cardiac flow fields at three idealized ventricular morphologies, 62nd Annual Meeting of the APS Division of Fluid Dynamics, November 22–24, 2009; Minneapolis, Minnesota

Kerem Pekkan, Paymon Nourparvar, Srinivasu Yerneni, Lakshmi Dasi, Diane de Zelicourt Fogel M., Yoganathan AP, On the flow through the normal fetal aortic arc at late gestation, APS Division of Fluid Dynamics 59th Annual Meeting, Florida, 2006

Diane de Zelicourt, Chang Wang, Hiroumi Kitajima, Kerem Pekkan, Sotiropoulos F., Yoganathan AP, Unstructured Cartesian/Immersed Boundary Method for Flow Simulations in Complex 3D Geometries, APS Division of Fluid Dynamics 59th Annual Meeting, Florida, 2006

Pekkan K, Sasmazel A, Sundareswaran K, Parks WJ, Kanter K, Lucas C, Fogel M, Yoganathan A “Respiratory Augmentation of Blood Flow in the Early Post-Op Fontan Circulation – Feasibility of Intra-Pulmonic Balloon Pumping and External Counterpulsation of Systemic Venous Return” 16th World Congress of the World Society of Cardio-Thoracic Surgeons, Ottawa, Canada, August 17-20, 2006

Pekkan K., Dasi P., Wang C., deZelicourt D., Sotiropoulos F., Yoganathan AP, Fluid flow and dissipation in intersecting counter-flow pipes, APS Division of Fluid Dynamics 58th Annual Meeting, Chicago, 2005).

Akbari P., Alparslan B, Pekkan K., Kilchyk V., Nalim R., Numerical analysis of hydrogen-fueled wave rotors for gas turbine applications, First International Hydrogen Energy Congress, July 13-15, 2005, Istanbul, Turkey.

Lucas C. N., Ketner M., Steele B., Mill M. R., Sheridan B., Lucas W. J., Pekkan K., Yoganathan A. P., Toward an Understanding of the effects of Graft Compliance in Fontan Repairs, Biomedical Engineering Society (BMES) Annual Fall Meeting, Baltimore, MD, September 28 – October 1 2005.

Kitajima H. D., Teisseire T., Sundareswaran K., Pekkan K., Oshinski J., Skrinjar O.,

Yoganathan A. P., Advantage of Semi-Automation over Manual Registration Comparing PIV and In Vitro PC-MRI Velocimetry, Biomedical Engineering Society (BMES) Annual Fall Meeting, Baltimore, MD, September 28 – October 1 2005.

Pekkan K., de Zelicourt D. A., Yoganathan P. A., “In Vitro Flow Visualization of a Post-Surgery Total Cavopulmonary Connection Anatomy” 21st Annual Gallery of Fluid Motion, APS Division of Fluid Dynamics 56th Annual Meeting, 2003.

4.G Other Writings (Technical Reports and Testimony)

Pekkan K., February 1995, Computer Aided Design and Manufacturing of Centrifugal Pump Impellers, M. Sc. Thesis, METU, Ankara, Turkiye.

Eyi M., Taskinoglu E., Pekkan K., Tinaztepe T., Internal Flow Modeling of Solid Propellant Rocket Motors. (2D Axisymmetric Euler, with Gas Injection) NATO-Research and Technology Agency T-108. Support Project, 1999.

Arkun U., Ertekin A., Goral G., Kaya G., Koc S., Odabasi G., Pekkan K., Seckin B., Sahin K., Unlu M., Yumusak M., Demonstration Motor Design Studies Conclusion Report (July 1998 - June1999), Roketsan Inc. Internal Report No: GN-RS-RP-R-634, Ankara, 1999.

Pekkan K., Nalim R., Two-Dimensional Flow and NOx Emissions in Deflagrative Internal Combustion Wave Rotor Configurations, NAG3-2207, NASA Glenn Research Center Grant Report, 2001.

Pekkan K., November 2000, Development of a Two-Dimensional Time-Dependent Euler Solver for Moving Boundaries in Cartesian Grids Applied to Injection Driven Internal Flows, Ph. D. Thesis, METU, Ankara, Turkey.

Jones C., Frakes D., Pekkan K., Yoganathan A., Understanding/Improving Flow Dynamics in Fontan Surgeries, NIH Progress Report, Grant No: HL67622, May 2003, May 2004 and May 2006.

4.H Discussion or Reviews of Candidate’s Work

de Leval MR, Re:TCPC in patients with apicocaval juxtaposition: optimal conduit route using preoperative angiogram and flow simulation, *European Journal of Cardiothoracic Surgery*, 44(1):e52, 2013 (Prof. Mark de Leval, is the leading pediatric cardiovascular surgeon, from Great Ormond Street Hospital, London. Prof. de Leval established the modern pediatric cardiovascular surgery)

Nature - 2013 upcoming EMBO awardees

ERC Grant related news at Turkish newspapers 2012 (Milliyet Meral Tamer, Star Gazetesi Ozlem Yurtcu, Cumhuriyet, Koc-Frontier, Koc University Facebook video recording

Kerem Pekkan had a podcast interview posted at Regenerative Medicine Today, Summer 2009

Candidate's work on ventricle assist devices for single ventricle patients, "Outcome of third pediatric support meeting," ASAIO J, vol. 54, no.2, pp. 141-6, 2008.

4.I Patents

1. Novel aortic outflow cannula for pediatric and neonatal cardiopulmonary bypass procedures", US Patent Issued, 2015
2. Piskin, Pekkan, Pre-operative development of patient-specific vascular patch graft prototypes for pediatric and neonatal patients, PCT/TR2015/000243, 2015
3. Donmezov, Pekkan, Non-invasive determination of soft tissue residual stress, PCT/TR2014/000400, 2014
4. M. B. Yigit, S. Piskin, S. Donmez, K. Pekkan, Fluid-Structure Modeling and Analysis System for Surgical Planning of Neonatal and Fetal Cardiovascular Repair Surgeries. European Patent Institution Application number 2013/12991. Filed November 8, 2013. Also PCT/TR2014/000263
5. Feragani, Pekkan, Partial flexible airfoils for passive flow control, PCT application (positive review), 2013
6. Turkoz, Pekkan, Venous flow controlled fenestration, Disclosure, 2012
7. Dur, Pekkan, Pulsatile Noninvasive Single-Ventricle Assist, Provisional Patent, 2011
8. Bernstein, Dur, Pekkan, Yoshida, An Optimization and Rapid Prototyping Suite for Use with the Creation of Artificial Heart Valves, US PATENT, 2013
9. Bernstein, Dur, Pekkan, Yoshida, A Device for the Creation of Sinus Geometry in Artificial Heart Valves, Invention Disclosure, 2011
10. Bernstein, Dur, Pekkan, Yoshida, An Optimized, Bicuspid Pulmonary Valve Conduit, Invention Disclosure, 2011
11. Menon, Pekkan, Real Time Fluid Dynamics Simulator For Cardiovascular Surgical Planning, 2010
12. Soerensen, Pekkan, Yoganathan, Anat. Connection, U.S. Patent 7,811,244, 2010
13. Pekkan, Patrick, Wagoner, Dynamic morphology reconstruction via confocal microscope" Invention Disclosure, 2008
14. Pekkan, de Zelicourt, Yoganathan, Morphological models using rapid prototyping, Invention Disclosure, 2007

5. Grants and Contracts Awarded to Date

5.A Principal Investigator

1. University of Bath – Koc University seed grant for collaborative research on cardiovascular device computational analysis, starts 2016, €25,000
2. Turkish National Science Foundation (TUBITAK) Priority Area Grant 1003, Patch design for complex congenital heart diseases, 2016-2019, €500,000
3. European Research Council (ERC) Proof of Concept Grant, KidsSurgicalPlan: An Internet enterprise for sketch-based cardiovascular pre-surgical planning, January 2015-2017, €150,000
4. Bridging computational multi-scale myocyte mechanics with ventricle function for customized heart valve design tool, Pennsylvania Infrastructure Technology Alliance (PITA), 2013-2014, \$80,000.

5. European Molecular Biology Organization (EMBO), Installation Grant, 2013-2017, €250,000 (renewed for two years Fall 2015)
6. European Research Council (ERC) Consolidator Grant, Bioengineering prediction of three-dimensional vascular growth and remodeling in embryonic great-vessel development, January 2013-2018, €2,000,000
7. National Science Foundation (NSF), Research Experience for Undergraduates REU in cardiovascular engineering and medical device design, May 2011-May 2015, \$12,000.
8. Marie-Curie FP7, Career Integration Grant, 2011-2016, €100,000
9. Dowd-ICES fellowship “Hemodynamic control of neonatal aortic outflow cannula jet flow regimes for improved cardiopulmonary bypass using CFD” August 2011, \$65,000 supports, one graduate student)
10. CIT Internal Infrastructure Award: Time-resolved and three-dimensional quantitative velocimetry at micro, cellular and macro scales for studying high-speed biological fluid dynamics, two-phase turbulence and bioinspired engineering, June 2010, \$200,000.
11. NSF CAREER: Internal Biofluid Dynamics in Embryonic Cardiovascular Development, Morphomechanics and Comparative Ontogeny, National Science Foundation (US), May 2010-May 2015, \$450,000.
12. Koc University Office of Education and Learning (KOLT) two innovation in higher education grants (PBL in Teaching Biomechanics and Biomimetic Engineering courses), 2013, \$3000
13. Pre-surgical planning and patient-specific CFD optimization of valve sparing aortic root reconstruction surgeries, Pennsylvania Infrastructure Technology Alliance (PITA), March 2008 – March 2009, \$80,000.
14. Bioengineering Analysis of Embryonic Hypoplastic Aortic Arch During the Period of Arterial Morphogenesis, American Heart Association-Beginning-Grant-in-Aid, July 2007 - July 2009, \$100,000. (with top score)
15. Building Micro-scale Three-dimensional Transparent Anatomical Replicas of the Developing Heart for Studying Embryonic Hemodynamics, Berkman Faculty Development Fund, May 2007, \$5,000.

5.B Co- Investigator

1. LetHPC (PI Didem Unat) in preperation
2. NSF- Partnerships for Innovation: Building Innovation Capacity, (PI: Blum PI) Bridging University Innovation and Commercialization of Future Generation Technologies: Targeting Orphan Devices. (2012 - pending)
3. CIT Internal Infrastructure Award: Confocal macro zoom microscope, 2011, \$188,000. (PI: Feinberg)
4. A seed grant from Texas A&M Institute for Preclinical Studies (TIPS), Developing large animal models for Fontan circulation and venous assist, 2011, (\$100,000, PI: Kocyildirim)
5. M. Sitti and K. Pekkan, “Stride: Surface Tension Driven Biologically Inspired Miniature Water Strider Robots,” PITA, \$55,591, 9/1/06 to 6/31/08.

6. R. Nalim and K. Pekkan, “Wave Rotor Engine for Space Propulsion, for system design of single-stage-to-orbit internal combustor wave rotors,” Blue Operations LLC, \$15,000, 39/1/03 to 3/1/04.

5.C Faculty Associate

1. EU-COST Action: A cross-disciplinary European Action to understand Coronary-Artery-Bypass failure and perform graft engineering, pending, Coordinators: Gaetano and Martelli, 2014, travel cost for the network
2. NSF-REU Pittsburgh Tissue Engineering Initiative (PTEI) (multidisciplinary undergraduate research program in functional tissue engineering with a specific focus on biomechanics), (PI: Abramowitch) (2012 - pending)
3. NIH T32, Cardiovascular Biomechanics in Regenerative Medicine, Participating Faculty Mentor, (PI: Sacks)
4. NIH RO1 HL089456-01 Co-PI/Consultant on “Multiscale Model of Thrombosis in Artificial Circulation” 2009 (PI: Antaki)

6. Professional Activities

6.A Invited Seminars

1. 2015 Invited talk: NAVBO Vascular Matrix Biology and Bioengineering Workshop, Cape Cod, MA
2. 2015 Invited talk: Virginia Tech Biomedical/bioinspired engineering department
3. 2015 Invited Talk: Koc University Incubator, Tech2B: commercialization of cardiovascular devices.
4. 2015 Invited talk: ITU Aerospace Department, Istanbul, TR
5. Winter school on nanomedicine, tissue engineering: Current Challenges and Future (distinguished speaker) Istanbul Kultur University, December 19-21, 2014
6. 2014: Invited talk: BMES Meeting National Science Foundation (NSF) Special Session, San Antonio
7. 2013-14 Invited talks: Texas A&M, University of Florida, University of Limerick (Ireland), Kyoto University (Japan), Indiana University - Purdue University
8. Stanford University, Palo Alto California, Design of intraoperative pediatric right ventricle heart valves, May 2012, 3rd International Conference on Engineering Frontiers in Pediatric and Congenital Heart Disease, Invited talk
9. 2012 Invited Talks in Turkey: Bilkent University Nanotechnology Center, Acibadem University, Bosphorus University, Summer Workshop on Computational Biology, Summer Workshop on Biomedical Sciences and Engineering, National Chemical Engineering Conference - Opening Talk, Success Story Presentation ERC Information Day, European Medical School Students Association Meeting
10. Beijing Institute of Technology, Beijing China, Embryonic and pediatric applications of cardiovascular fluid mechanics, October 2011, Invited lecture
11. Shanghai Children’s Medical Center (via president, Liu Jinfen), Shanghai China, High-throughput patient-specific pre-surgical hemodynamic planning of Fontan

- reconstructions, jointly hosted with Shanghai JiaoTong University, Mechanical Engineering Department, September 2011, Invited seminars
12. Virginia Commonwealth University, NIH-International Conference on Mathematical Modeling and Computer Simulation of Cardiovascular and Cardiopulmonary Dynamics, Williamsburg VA, *CFD Validation using particle image velocimetry*, June 2011, Invited lecture
 13. World Society for Pediatric and Congenital Heart Surgery- 3rd Scientific Meeting, Istanbul Turkey, *Advances in computational pre-surgical planning of congenital heart defect reconstructions*, June 2011, Invited lecture
 14. 7th Pediatric Mechanical Circulatory Support Systems Conference, Philadelphia PA, *Computational fluid dynamics to improve hemodynamics of congenital aortic cannulation*, May 2011, Invited talk
 15. National University of Ireland (NUI), 17th Bioengineering in Ireland Conference, Galway Ireland, *Embryonic and pediatric applications of cardiovascular fluid dynamics*, February 2011, Keynote talk
 16. University of Pittsburgh – Biomechburgh Seminars, Pittsburgh PA, *In vitro cardiovascular fluid dynamics using particle image velocimetry (PIV)*, February 2011, Invited seminar
 17. Allegheny General Hospital (AGH), Pittsburgh PA, *Patient-specific cardiovascular fluid dynamics*, January 2011, Invited talk
 18. Carnegie Mellon University, Pittsburgh PA, *Embryonic and pediatric applications of cardiovascular fluid dynamics*, April 2011, BME Promotion Seminar
 19. Carnegie Mellon University, Pittsburgh PA, *High-speed multi-phase blood cell flow using confocal scanning microscopy for development of next-generation blood damage models*, November 2010, BME Seminar
 20. Arizona State University, Tempe AZ, *Hemodynamics of early embryonic aortic arch development*, February 2010, Invited talk
 21. Georgia Institute of Technology, Atlanta GA, 30th year anniversary of CFM laboratory, January 2010, Invited talk
 22. Pekkan K “Towards quantitative hemodynamic prediction in challenging single-ventricle circuits: surgical pathway designs, pVADs and adult Fontans” Invited talk, Fifth International Conference on Pediatric Mechanical Circulatory Support Systems and Pediatric Cardiopulmonary Perfusion, May 27-30, 2009, Dallas, Texas.
 23. Pekkan K, Hemodynamics of non-traditional circulation systems, Koc University – Turkey, Invited Talk, July 14, 2008
 24. Pekkan K, Yajuan W, Patrick MJ, Keller BB, Hemodynamic investigation of the embryonic aortic arch development, 4th Annual Bioimaging Day, Carnegie Mellon University, February 28, 2008.
 25. Hemodynamic Modeling and Visualization of Developing Arches and Single Ventricle Circuits,” 2008, McGowan Institute of Regenerative Medicine 2008 Scientific Retreat, Farmington, PA 03/11/08, Invited Talk
 26. Pekkan K, Cardiovascular Biomechanics, Invited Workshop, Middle East Technical University, Turkey, July 2007.
 27. Pekkan K, Whited B, Kanter K, Sharma S, Sundareswaran K, Frakes D, Rossignac J, Yoganathan A, Anatomical Image Databases for Computational Fluid Dynamics and

- Surgical Planning, 3rd Annual Bioimaging Day, Carnegie Mellon University, February 21, 2007
28. Pekkan K., Progress towards understanding anatomical fluid dynamics and surgical planning of the TCPC, Biomedical Engineering Society (BMES) Annual Fall Meeting, Philadelphia, PA, October 13-16 2004. (Invited Talk)

6.B Government Committees, Civic Appointments, Board Memberships

American Heart Association, Cardiac development and Bioengineering review panels.
 National Science Foundation (NSF) review panels.
 NIH ZRG1 F10A Physiology and Pathobiology of Cardiovascular and Respiratory Systems Panel Member, December 2014
 Tubitak reviewer 2015

6.C Membership and Activities in Honorary Fraternities, Professional Societies

1. Member, Biomedical Engineering Society (BMES)
2. Member, American Society of Mechanical Engineers (ASME)
3. Member, American Heart Association (AHA)
4. Member, International Society for Applied Cardiovascular Biology (ISACB)
5. Member, European Society of Biomechanics (ESB)
6. Past Member, American Institute of Aeronautics and Astronautics (AIAA)
7. Member, American Society for Engineering Education (ASEE)
8. Member, American Physical Society, Division of Fluid Dynamics (APS/DFD)
9. Member, ASAIO
10. Member, International Society for Pediatric Cardiopulmonary Support

6.D Editorial Roles on Publications, Major Activities in Professional Meetings

Associate Editor, Artificial Organs since 2013
Associate Editor, Cardiovascular Engineering and Technology Journal since 2014
Associate Editor, Frontiers (EPFL) since 2014
Guest Editor Cardiovascular Engineering and Technology Journal, Special Issue in Fetal Hemodynamics, 2012 (Associate Editor from 2013)
ASME Summer Bioengineering Meeting Student Paper Competition Committee Co-chair (4-year appointment 2011-2015) (discontinued on 2013 due to on leave from CMU)
Session Chair: Biofluids PhD Student Competition, ASME Summer Bioengineering Meeting, 2009
Student competition judge, ASME Summer Bioengineering Meeting, 2007, 2008
Session Chair: APS Division of Fluid Dynamics 58th Annual Meeting, Chicago, 2005.
Session Chair: APS Division of Fluid Dynamics 66th Annual Meeting, Pittsburgh, 2013.
Session Chair: World Congress of Biomechanics Meeting, 2014

6.E Awards, Prizes, Honors

ERC Consolidator Grant Recipient 2012

NSF CAREER Award 2010

Prof. Dr. -Ing. Helmut Reul Young Investigators Award, May 2005

METU graduate thesis award for Master of Thesis study, June 1993, \$4,500.

Bachelor of Science graduation with high honors with rank 7 out of a class of 256 mechanical engineering students, July 1992.

6.F Service on CMU Committees

University Safety Committee (Chair)

BME Undergraduate Affairs Committee

BME Graduate Affairs Committee

BME Department chair search meetings/comments

Served in three qualification exams as of 2007-2008

BME Undergraduate student advising

University Ethics and Institutional Review Board Member (Koc University) 2013-2014

Coordinator of Biomedical Sciences and Engineering Graduate Program (Koc University) 2012-2013

University Clinical Research IRB Board Member (Koc University)

7. Other

Reviewer: American Journal of Physiology, Journal of Biomechanical Engineering, Tissue Engineering, Annals of Biomedical Engineering, Circulation, Annals of Thoracic Surgery, Journal of Thoracic and Cardiovascular Surgery, ASAIO Journal, International Journal of Computer Assisted Radiology and Surgery, Artificial Organs, Computers in Biology and Medicine, Computers in Fluids, Biomed Sci Instrum, Circulation, MBEC Journal, Lytmos ASME Internal Combustion Engine Division, International Meshing Roundtable of Sandia Laboratories

BME seminar series: I attended almost all presentations and formally met with the presenters. I invited Ron Adrian, Ross Ethier, Mory Gharib, Robin Shandas, Lance Davidson from UPitt and David Frakes from ASU and helped organizing their schedules and visits.

Served as a judge and attended annual Biomedical Engineering & Biotechnology Research Symposium (BEBRS) 2009, organized by GBMES-CMU, Chair, Co-Chair ASME-Summer Bioengineering meetings

Presented at the American Heart Association Pittsburgh Research Days, 2011

Organized Openfoam CFD training workshop with Fred Higgs, 2011

Prepared the Biomechanics and Tissue mechanics section of the CMU BME Advisory board meeting document, organized lab tours and presentation during the meeting.