

**Prof. Dr. med. Alexander Assmann**

Date of birth: May the 3<sup>rd</sup>, 1981 in Fuerstenfeldbruck, Germany

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**CURRICULUM VITAE**

**Study:**

2001 – 2007 Study of medicine at the University of Duesseldorf, Germany  
2002 – 2007 Stipendiary of the German National Merit Foundation  
2007 Medical state examination (grade *excellent*)

**Work:**

2007 – 2015 Resident in cardiac surgery in the Department of Cardiovascular Surgery, University of Duesseldorf  
2013 – 2014 Postdoctoral research fellow at the Biomaterials Innovation Research Center, Department of Medicine, Brigham and Women’s Hospital, Harvard Medical School, Cambridge, MA, USA, and the Harvard-MIT Division of Health Sciences and Technology, Massachusetts Institute of Technology, Cambridge, MA, USA  
Since 2014 Affiliated collaborator of the Biomaterials Innovation Research Center, Department of Medicine, Brigham and Women’s Hospital, Harvard Medical School, Cambridge, MA, USA  
Since 2015 Attending cardiac surgeon in the Department of Cardiovascular Surgery, University of Duesseldorf  
Clinical proctor for endoscopic vessel preparations  
2016 Additional qualification in intensive care medicine  
Since 2019 Head of coronary bypass surgery in the Department of Cardiac Surgery, University of Duesseldorf

**Dissertation:**

2008 Doctorate in medicine with the thesis “Intracoronary transplantation of HUVECS in the rat myocardium: Feasibility and cell destiny” (Institute of Heart and Circulatory Physiology, University of Duesseldorf; grade *summa cum laude*)

**Habilitation:**

2015 *Habilitation (Venia legendi)* with the thesis “Optimization of the biocompatibility of cardiovascular implants in a standardized rat model” (Experimental → Cardiac Surgery, Medical Faculty, University of Duesseldorf)

**Scientific foci:**

Cardiovascular biomaterials Computational fluid dynamics in the cardiovascular system  
Coronary surgery Extracorporeal circulation

**Publications – Overview:**

Original articles: 45  
Cumulative impact factor: 205,8  
H-Index: 17  
Review articles: 14  
Books (as editor): 5

(for details, please see the attached publication list)

**Awards:**

2014 Ulrich Karsten Scientific Award (by the German Society for Thoracic and Cardiovascular Surgery)  
2015 Edens Award for Heart and Circulatory Research (by the Eberhard Iglar Foundation)  
2016 Vascular Surgical Research Award (by the German Society for Thoracic and Cardiovascular Surgery)

**Memberships:**

German Society for Thoracic and Cardiovascular Surgery

- Executive committee of the Working Group for ECC and Mechanical Circulatory Support
- Executive committee for the national interdisciplinary guideline on ECLS therapy
- Member of the Working Group for Basic Science

European Association for Cardio-Thoracic Surgery  
Heart Valve Society  
Tissue Engineering and Regenerative Medicine International Society  
The CardioThoracic Surgery Network

### Original articles:

1. Annabi N, Shin SR, Tamayol A, Miscuglio M, Afshar M, **Assmann A**, Mostafalu P, Sun JY, Mithieux S, Cheung L, Tang XS, Weiss AS, Khademhosseini A. Highly elastic and conductive human-based protein hybrid hydrogels. **Adv Mater**. 2016; 28(1):40-49.
2. Annabi N, Zhang YN, **Assmann A**, Vegh A, Cheng G, Dehghani B, Lassaletta A, Gangadharan S, Weiss AS, Khademhosseini A. Engineering a highly elastic human protein-based sealant for surgical applications. **Sci Transl Med**. 2017; 9(410). pii: eaai7466.
3. Zhang YN, Avery RK, Vallmajo-Martin Q, **Assmann A**, Vegh A, Memic A, Olsen BD, Annabi N, Khademhosseini A. A Highly Elastic and Rapidly Crosslinkable Elastin-Like Polypeptide-Based Hydrogel for Biomedical Applications. **Adv Funct Mater**. 2015; 25(30):4814-4826.
4. Gaharwar AK, Avery RK, **Assmann A**, Paul A, McKinley GH, Khademhosseini A, Olsen BD. Shear-Thinning Nanocomposite Hydrogels for the Treatment of Hemorrhage. **ACS Nano**. 2014; 8(10):9833-9842.
5. **Assmann A**, Vegh A, Ghasemi-Rad M, Bagherifard S, Cheng G, Sani ES, Ruiz-Esparza GU, Noshadi I, Lassaletta AD, Gangadharan S, Tamayol A, Khademhosseini A, Annabi N. A highly adhesive and naturally derived sealant. **Biomaterials**. 2017; 140:115-127.
6. **Assmann A**, Zwirnmann K, Heidelberg F, Schiffer F, Horstkötter K, Munakata H, Gremse F, Barth M, Lichtenberg A, Akhyari P. The degeneration of biological cardiovascular prostheses under pro-calcific metabolic conditions in a small animal model. **Biomaterials**. 2014; 35(26):7416-7428.
7. **Assmann A**, Delfs C, Munakata H, Schiffer F, Horstkötter K, Huynh K, Barth M, Stoldt VR, Kamiya H, Boeken U, Lichtenberg A, Akhyari P. Acceleration of autologous in vivo recellularization of decellularized aortic conduits by fibronectin surface coating. **Biomaterials**. 2013; 34(25):6015-6026.
8. Masoumi N, Annabi N, **Assmann A**, Larson BL, Hjortnaes J, Alemdar N, Kharaziha M, Manning KB, Mayer JE, Khademhosseini A. Tri-layered elastomeric scaffolds for engineering heart valve leaflets. **Biomaterials**. 2014; 35(27):7774-7785.
9. Burghoff S, Ding Z, Gödecke S, **Assmann A**, Wirrwar A, Buchholz D, Sergeeva O, Leurs C, Hanenberg H, Müller HW, Bloch W, Schrader J. Horizontal gene transfer from human endothelial cells to rat cardiomyocytes after intracoronary transplantation. **Cardiovasc Res**. 2008; 77(3):534-543.
10. Albert A, Ennker J, Hegazy Y, Ullrich S, Petrov G, Akhyari P, Bauer S, Uerer E, Ennker IC, Lichtenberg A, Priss H, **Assmann A**. Implementation of the aortic no-touch technique to reduce stroke after off-pump coronary surgery. **J Thorac Cardiovasc Surg**. 2018; 156(2):544-554.e4.
11. Hoffmann T, **Assmann A**<sup>corr</sup>, Dierksen A, Roussel E, Ullrich S, Lichtenberg A, Albert A, Sixt S. A role for very low-dose recombinant activated factor VII in refractory bleeding after cardiac surgery: Lessons from an observational study. **J Thorac Cardiovasc Surg**. 2018; 156(4):1564-1573.e8.
12. Paul A, Manoharan V, Krafft D, **Assmann A**, Uquillas JA, Shin SR, Hasan A, Hussain MA, Memic A, Gaharwar A, Khademhosseini A. Nanoengineered biomimetic hydrogels for guiding human stem cell osteogenesis in three dimensional microenvironments. **J Mater Chem B Mater Biol Med**. 2016; 4:3544-3554.
13. Nagy E, Lei Y, Martínez-Martínez E, Body SC, Schlotter F, Creager M, **Assmann A**, Khabbaz K, Libby P, Hansson GK, Aikawa E. Interferon- $\gamma$  Released by Activated CD8<sup>+</sup> T Lymphocytes Impairs the Calcium Resorption Potential of Osteoclasts in Calcified Human Aortic Valves. **Am J Pathol**. 2017; 187(6): 1413-1425.
14. Boeken U, **Assmann A**, Mehdiyani A, Akhyari P, Lichtenberg A. Open chest management after cardiac operations: outcome and timing of delayed sternal closure. **Eur J Cardiothorac Surg**. 2011; 40(5):1146-1150.
15. Schaal NK, **Assmann A**, Rosendahl J, Mayer-Berger W, Icks A, Ullrich S, Lichtenberg A, Akhyari P, Heil M, Ennker J, Albert A. Health-related quality of life after heart surgery - Identification of high-risk patients: A cohort study. **Int J Surg**. 2020; 76:171-177.
16. Sugimura Y, Chekhoeva A, Oyama K, Nakanishi S, Toshmatova M, Miyahara S, Barth M, Assmann AK, Lichtenberg A, **Assmann A**<sup>corr</sup>, Akhyari P. Controlled autologous recellularization and inhibited degeneration of decellularized vascular implants by side-specific coating with stromal cell-derived factor 1 $\alpha$  and fibronectin. **Biomed Mater**. 2020; 15(3):035013.
17. **Assmann A**, Struß M, Schiffer F, Heidelberg F, Munakata H, Timchenko EV, Timchenko PE, Kaufmann T, Huynh K, Sugimura Y, Leidl Q, Pinto A, Stoldt VR, Lichtenberg A, Akhyari P. Improvement of the in vivo cellular repopulation of decellularized cardiovascular tissues by a detergent-free, non-proteolytic, actin-disassembling regimen. **J Tissue Eng Regen Med**. 2017; 11(12):3530-3543.
18. Iijima M, Aubin H, Steinbrink M, Schiffer F, **Assmann A**, Weisel RD, Matsui Y, Li RK, Lichtenberg A, Akhyari P. Bio-active coating of decellularized vascular grafts with a temperature-sensitive VEGF-conjugated hydrogel accelerates autologous endothelialization in vivo. **J Tissue Eng Regen Med**. 2018; 12(1):e513-e522.
19. Munakata H, **Assmann A**, Poudel-Bochmann B, Horstkötter K, Kamiya H, Okita Y, Lichtenberg A, Akhyari P. Aortic conduit valve-model with controlled moderate aortic regurgitation in rats: A technical modification to improve short- and long-term outcome and to increase the functional results. **Circ J**. 2013; 77(9):2295-2302.
20. Toshmatova M, Nakanishi S, Sugimura Y, Schmidt V, Lichtenberg A, **Assmann A**<sup>corr</sup>, Akhyari P. Influence of laminin coating on the autologous in vivo recellularization of decellularized vascular prostheses. **Materials (Basel)**. 2019; 12(20). pii: E3351. doi: 10.3390/ma12203351.
21. **Assmann A**, Heke M, Kröpil P, Ptok L, Hafner D, Ohmann C, Martens A, Karluß A, Emmert MY, Kutschka I, Sievers HH, Klein HM. Laser-Supported CD133<sup>+</sup> Cell Therapy in Patients with Ischemic Cardiomyopathy: Initial Results from a Prospective Phase

- I Multicenter Trial. **PLoS One**. 2014 Jul 7;9(7):e101449.
22. Benim AC, Nahavandi A, **Assmann A**, Schubert D, Feindt P, Suh SH. Simulation of blood flow in human aorta with emphasis on outlet boundary conditions. **Appl Math Modell**. 2011; 35(7):3175-3188.
  23. Minol JP, Reinsch I, Luik M, Leferink A, Barth M, **Assmann A**, Lichtenberg A, Akhyari P. Focal induction of ROS-release to trigger local vascular degeneration. **PLoS One**. 2017; 12(6):e0179342.
  24. **Assmann A**, Benim AC, Gül F, Lux P, Akhyari P, Boeken U, Joos F, Feindt P, Lichtenberg A. Pulsatile extracorporeal circulation during on-pump cardiac surgery enhances aortic wall shear stress. **J Biomech**. 2012; 45(1):156-163.
  25. Sugimura Y, Schmidt AK, Lichtenberg A, **Assmann A**<sup>\*corr</sup>, Akhyari P. A Rat Model for the In Vivo Assessment of Biological and Tissue-Engineered Valvular and Vascular Grafts. **Tissue Eng Part C Methods**. 2017; 23(12):982-994.
  26. Aubin H, Mas-Moruno C, Iijima M, Schütterle N, Steinbrink M, **Assmann A**, Gil J, Lichtenberg A, Pegueroles M, Akhyari P. Customized interface biofunctionalization of decellularized extracellular matrix: towards enhanced endothelialization. **Tissue Eng Part C Methods**. 2016; 22(5):496-508.
  27. Timchenko EV, Timchenko PE, Lichtenberg A, **Assmann A**, Aubin H, Akhyari P, Volova LT, Pershutkina SV. Assessment of decellularization of heart bioimplants using a Raman spectroscopy method. **J Biomed Opt**. 2017; 22(9):91511.
  28. **Assmann A**, Horstkötter K, Munakata H, Schiffer F, Delfs C, Zwirnmann K, Barth M, Akhyari P, Lichtenberg A. Simvastatin does not diminish the in vivo degeneration of decellularized aortic conduits. **J Cardiovasc Pharmacol**. 2014; 64(4):332-342.
  29. Benim AC, Frank T, **Assmann A**, Lichtenberg A, Akhyari P. Computational investigation of hemodynamics in hardshell venous reservoirs: A comparative study. **Artif Organs**. 2020; 44(4):411-418.
  30. **Assmann A**, Gül F, Benim AC, Joos F, Akhyari P, Lichtenberg A. Dispersive aortic cannulas reduce aortic wall shear stress affecting atherosclerotic plaque embolization. **Artif Organs**. 2015; 39(3):203-211.
  31. Zhu E, Westenfeld R, Gastl M, Bönner F, **Assmann A**, Nia AM, Kelm M, Jung C. Acute chest pain in a triathlete: rupture of the noncoronary sinus of Valsalva into the right ventricle. **J Thorac Dis**. 2016; 8(10):E1199-E1201.
  32. **Assmann A**, Akhyari P, Delfs C, Flögel U, Jacoby C, Kamiya H, Lichtenberg A. Development of a growing rat model for the in vivo assessment of engineered aortic conduits. **J Surg Res**. 2012; 176(2):367-375.
  33. Assmann AK, Akhyari P, Demler F, Lichtenberg A, **Assmann A**. A magnetic resonance imaging-compatible small animal model under extracorporeal circulation. **Interact Cardiovasc Thorac Surg**. 2019; 29(4):612-614.
  34. **Assmann A**, Minol JP, Mehdiani A, Akhyari P, Boeken U, Lichtenberg A. Cardiac surgery in nonagenarians: Not only feasible, but also reasonable? **Interact Cardiovasc Thorac Surg**. 2013; 17(2):340-343; discussion 343.
  35. **Assmann A**, Boeken U, Klotz S, Harringer W, Beckmann A. Organization and Application of ECLS Therapy-A Nationwide Survey in German Cardiosurgical Departments. **Thorac Cardiovasc Surg**. 2019; 67(3):164-169.
  36. **Assmann A**, Boeken U, Feindt P, Schurr P, Akhyari P, Lichtenberg A. Vacuum-assisted wound closure is superior to primary rewiring in patients with deep sternal wound infection. **Thorac Cardiovasc Surg**. 2011; 59(1):25-29.
  37. **Assmann A**, Boeken U, Feindt P, Schurr P, Akhyari P, Lichtenberg A. Heparin-induced Thrombocytopenia Type II after Cardiac Surgery: Predictors and Outcome. **Thorac Cardiovasc Surg**. 2010; 58(8):463-467.
  38. **Assmann A**, Boeken U, Akhyari P, Lichtenberg A. Appropriate timing of coronary artery bypass grafting after acute myocardial infarction. **Thorac Cardiovasc Surg**. 2012; 60(7):446-451.
  39. Boeken U, Feindt P, Schurr P, **Assmann A**, Akhyari P, Lichtenberg A. Delayed Sternal Closure (DSC) After Cardiac Surgery: Outcome and Prognostic Markers. **J Card Surg**. 2011; 26(1):22-27.
  40. Benim AC, Gül F, **Assmann A**, Akhyari P, Lichtenberg A, Joos F. Validation of loss-coefficient based outlet boundary conditions for simulating aortic flow. **J Mech Med Biol**. 2016; 16(1):1650011.
  41. Boeken U, Minol JP, **Assmann A**, Mehdiani A, Akhyari P, Lichtenberg A. Readmission to the Intensive Care Unit in Times of Minimally Invasive Cardiac Surgery: Does Size Matter? **Heart Surg Forum**. 2014; 17(6):E296-E301.
  42. Saeed D, **Assmann A**, Abdeen M, Albert A, Maxhera B, Sadat N, Sixt S, Lichtenberg A. Implanting permanent left ventricular assist devices in patients on veno-arterial extracorporeal membrane oxygenation support. **Multimed Man Cardiothorac Surg**. 2016 Dec 9;2017. doi: 10.1510/mmcts.2016.003.
  43. Klein HM, **Assmann A**, Lichtenberg A, Heke M. Intraoperative CD133+ cell transplantation during coronary artery bypass grafting in ischemic cardiomyopathy. **Multimed Man Cardiothorac Surg**. 2010(0809):3947.
  44. Benim AC, Gül F, Nahavandi A, **Assmann A**, Feindt P, Joos F. Computational analysis of blood flow in human aorta. **IJEMFS**. 2010; 2(4):233-242.
  45. Ogunmuyiwa O, Rellecke P, Lichtenberg A, **Assmann A**. Muscular Mitral Chord Contribution to Left Ventricular Outflow Tract Obstruction in HOCM. **Thorac Cardiovasc Surg Rep**. 2019; 8(1):e18-e19.

### Review articles:

1. **Assmann A**, Boeken U, Lichtenberg A, Albert A. Operative Revaskularisation bei akutem Koronarsyndrom - Chancen durch individualisierte Strategien. *Z Herz- Thorax- Gefäßchir.* 2019. <https://doi.org/10.1007/s00398-019-0324-4>.
2. **Assmann A**, Akhyari P, Lichtenberg A. Optimierung der Biofunktionalität und Struktur dezellularisierter kardiovaskulärer Implantate. *Z Herz- Thorax- Gefäßchir.* 2017; 31:206-213.
3. **Assmann A**, Akhyari P, Lichtenberg A. Optimierung der Biofunktionalität und Struktur dezellularisierter kardiovaskulärer Implantate. *Spitzenforschung Herz-Kreislauf-Medizin. Innovationen und Auszeichnungen 2017.*
4. **Assmann A**. Minimierung des Wundtraumas in der Herzchirurgie durch endoskopische Gefäßentnahmen. *Forum Sanitas.* 2016; 3:3-5.
5. **Assmann A**, Akhyari P, Lichtenberg A. Dezellularisierte Aorten-Conduits und ihre Biokompatibilität - Optimierung in einem standardisierten Rattenmodell. *Z Herz- Thorax- Gefäßchir.* 2014; 28:456-463.
6. Suttner C, **Assmann A**\*corr, Boeken U, Akhyari P, Albert A, Lichtenberg A. Endoskopische Saphenektomie in der Koronarchirurgie – Revolution oder Risiko? *Z Herz- Thorax- Gefäßchir.* 2011; 25(3):122-128.
7. **Assmann A**, Boeken U, Feindt P, Lichtenberg A. Direkte Thrombininhibitoren - Eine Alternative zu Heparin während extrakorporaler Zirkulation? *Z Herz- Thorax- Gefäßchir.* 2010; 24(4):127-133.
8. **Assmann A**, Feindt P. Minimierte extrakorporale Zirkulation - Aktuelle Studienlage zum Einsatz minimierter HLM-Systeme. *Z Herz- Thorax- Gefäßchir.* 2009; 23(4):229-234.
9. Sugimura Y, Lichtenberg A, **Assmann A**, Akhyari P. Verbesserte Biokompatibilität von dezellularisierten Gefäßimplantaten mit „stromal cell-derived factor 1 $\alpha$ “. *Z Herz- Thorax- Gefäßchir.* 2020; 34:320-326. doi: 10.1007/s00398-020-00386-y.
10. Minol JP, Reinsch I, Luik M, Leferink A, Barth M, **Assmann A**, Lichtenberg A, Akhyari P. Reaktive Sauerstoffspezies und Gefäßdegeneration. *Z Herz- Thorax- Gefäßchir.* 2018; 32:242-247.
11. Schmidt AK, **Assmann A**, Lichtenberg A, Boeken U. Systemische Inflammation und Herzchirurgie - Bedeutung im Zeitalter von minimierter Herz-Lungen-Maschine und „Off-pump“-Chirurgie. *Z Herz- Thorax- Gefäßchir.* 2018; 32:59-66.
12. Boeken U, Ensminger S, Burckhardt M, Pilarczyk K, Schmid C, Rastan A, Schlensak C, Klotz S, Falk V, **Assmann A**, Beckmann A. Erstellung einer S3-Leitlinie „Einsatz der extrakorporalen Zirkulation (ECLS/ECMO) bei Herz- und Kreislaufversagen“. *Z Herz- Thorax- Gefäßchir.* 2016; 30:318-324.
13. Akhyari P, Minol P, **Assmann A**, Barth M, Kamiya H, Lichtenberg A. Tissue Engineering von Herzklappen. *Chirurg.* 2011;82(4):311-318.
14. Boeken U, Feindt P, Akhyari P, **Assmann A**, Albert A, Lichtenberg A. Herzchirurgie im Jahr 2011 - Neue Techniken und minimalinvasive Methoden. *Intensiv.* 2011; 19:60-67.

### Books:

1. Albert A, **Assmann A**, Assmann AK, Aubin H, Lichtenberg A. Operative techniques in coronary artery bypass surgery – An illustrated guide to personalized therapy 2020; Springer International, Basel. ISBN: 978-3-030-48496-5.
2. Boeken U, **Assmann A**, Klotz S, Born F, Rieth A, Schmid C. Mechanische Unterstützung im akuten Kreislaufversagen 2020; Springer-Verlag, Berlin Heidelberg. ISBN 978-3-662-59900-6.
3. Boeken U, **Assmann A**, Born F, Klotz S, Schmid C. Mechanische Herz-Kreislauf-Unterstützung: Indikationen, Systeme, Implantationstechniken 2017; Springer-Verlag, Berlin Heidelberg. ISBN: 978-3-662-53489-2.
4. Klotz S, Boeken U, **Assmann A**. Leben mit einem Kunstherz – Ein Ratgeber für Betroffene, Angehörige und Interessierte 2016; Deutsche Herzstiftung, Frankfurt am Main. ISBN-13: 978-3981192681.
5. Boeken U, **Assmann A**, Born F, Schmid C. Mechanische Herz-Kreislauf-Unterstützung: Indikationen, Systeme, Implantationstechniken 2013; Springer-Verlag, Berlin. ISBN-10: 3642294073.