

Bruna Gomes, MD

Cardiology and internal medicine specialist
Postdoctoral Research Fellow
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Education/academic training

Since 07/01/2021 Postdoctoral researcher, Prof. Ashley lab, Stanford University, title: *Artificial intelligence applications in cardiovascular medicine*

Genetic bioinformatics software skills: GWAS analysis with plink, SAIGE, and REGENIE; meta-analysis with METAL; genetic burden-tests with Rvtests and SAIGE-gene; genetic correlations and heritability with LDSC; Mendelian randomization with 2SampleMR and CAUSE.

Computer vision: Developed *DeepFlow (Deep learning-based aortic blood Flow quantification)* available at <https://github.com/Urban90/deepFlow>.

Other technical skills/software: programming with Python (Scikit-image, Scikit-Learn, Open-CV, Nibabel, Pydicom, Tensorflow, Keras) statistical programming in R and SPSS.

Lead collaborator of the UK Biobank project id 22282

Principal investigator of the UK Biobank project id 63735

(<https://www.ukbiobank.ac.uk/enable-your-research/approved-research?anid=63735>)

06/2021 – 12/2021 Training for university professors, *Hochschuldidaktik* Baden Wuerttemberg, Germany

03/07/2018 Medical doctorate thesis in internal medicine, Heidelberg University, Germany (Grade: *magna cum laude*). Thesis title: *Improvements of Procedural Results With a New-Generation Self-Expanding Transfemoral Aortic Valve Prosthesis in Comparison to the Old-Generation Device*. Supervisor: Prof. Raffi Bekeredjian, MD.

2008 - 2014 Integrated Master in Medicine, Faculty of Medicine of the University of Coimbra, Portugal (Grade 18/20)

Master thesis (2014) in ophthalmology: *Characterization of a portuguese LCA family secondary to homozygous RPE65 mutation*. Thesis advisor: Prof. Eduardo Silva, MD, PhD.

2002 - 2008 Secondary School Diploma, Escola Secundária de S. Pedro, Vila Real Portugal (Grade 20/20)

1998 - 2008 Conservatorium of music, Porto, Portugal (Grade 18/20): subjects — piano, acoustics, history of music, theory of music, techniques of music composition, chamber music.

2007 – 2008 Mathematics school for young students (Delfos project, University of Coimbra, Portugal): preparing Portuguese teams for international Mathematics competitions.

2007 Physics Summer School, University of Porto, Portugal

Professional experience in medicine

Since 01/26/2021 Cardiology specialist, Heidelberg University Hospital, Germany

2014-2021 Cardiology residency fellow, Heidelberg University Hospital, Germany

2020/2021	Interventional cardiology
2018/2019	Cardiac magnetic resonance imaging and computerized tomography
2017/2018	<i>Chest pain unit</i> , intraoperative transesophageal echocardiography, electrophysiology
2016/2017	Intensive Care Unit (ICU)
2015/2016	Echocardiography (including transthoracic, stress and transesophageal ultrasound), coronary care unit (CCU)
2014/2015	Cardiology outpatient clinics, cardiology ward
07/31/2014	German license to practice medicine

Peer-reviewed, competitive scholarships

01/07/2021 - 01/07/2023 - Walter Benjamin Program of the German Research Foundation (DFG) Project number 457899528, <https://gepris.dfg.de/gepris/projekt/457899528>. Project title: *Prediction of clinical outcomes in patients with moderate aortic valve regurgitation using deep learning*.

11/30/2020 - Rahel Goitein-Straus Scholarship, Heidelberg University Hospital (cancelled due to overlapping funding from the German Research Foundation). Project title: *Unveiling aortic valve regurgitation's natural history using unsupervised machine learning*

Honors

2015	Award for the best student of the class 2008-2014, Faculty of Medicine, University of Coimbra, Portugal
2011 -2014	Award for the top 3% best students, University of Coimbra, Portugal
2011	Merit scholarship, University of Coimbra, Portugal
2009 -2010	Award for the top 3% best students, University of Coimbra, Portugal
2008	Merit Prize awarding the students with the best secondary school diploma, Ministry of Education, Portugal
	Merit Prize awarding the best secondary school student, Rotary Club, Portugal
	Finalist of the XVII Portuguese Mathematics Olympiad
	Finalist of the MegaSprinter athleticism contest, Portugal
2005	Finalist of the X Portuguese Environmental Olympiad
2003	Winner of the XXI Portuguese Mathematics Pre-Olympiad

Teaching experience

2018 – present	<i>Habilitation</i> -track teaching (German academic degree, teaching for > 30 h/semester): ECG, echocardiography, cardiac MRI, clinical anamnesis and physical examination.
2015 – 2018	Teaching of clinical skills: anamnesis and physical examination of 3 rd medical students, Heidelberg University Hospital, Germany
2012 – 2013	Tutor of practical classes of anatomy I/II and pathology II subjects, University of Coimbra, Portugal

Poster presentations and oral communications

2015 – 2019	Yearly presentations at the annual congress (81-85 th) of the German Society of Cardiology
09/2018	Abstract presentation at the 30 th TCT Congress, San Diego, USA
08/2018	Abstract presentation at the European Society of Cardiology 2018 Congress, Munich, Germany
09/2016	Abstract presentation at the PCR London Valves congress, London, United Kingdom

Publications

Gomes, B., Geis, N. A., Chorianopoulos, E., Meder, B., Leuschner, F., Katus, H. A. and Bekerredjian, R. *Improvements of Procedural Results With a New-Generation Self-Expanding Transfemoral Aortic Valve Prosthesis in Comparison to the Old-Generation Device.* J IntervCardiol. 2017; 30(1): 72-78.

Gomes, B., Katus, H. A. and Bekerredjian, R. *Repositionable Self Expanding Aortic Bioprosthesis.* Expert Rev Med Devices. 2017; 14(7): 565-576.

Harnath, A.*, **Gomes, B.***, Herwig, V., Gatto, F., Watremez, S., Katus, H. A. , Bekerredjian, R. *First experience with the 34mm self-expanding Evolut R in a multi-center registry.* 2018. Eurointervention. 2018; 14(3):298-300.
*co-first authors

Wiedemann, F., Schulte, J., **Gomes, B.**, Zafeiriou, M., Ratte, A., Rathjens, F., Fehrmann, E., Scholz, B., Voigt, N., Müller, F., Thomas, D., Katus, H. A., Schmidt, C. *Atrial fibrillation and heart failure-associated remodeling of two-pore-domain potassium (K2P) channels in murine disease models: focus on TASK-1.* Basic Res Cardiol. 2018; 113(4): 27.

Abu Sharar, H., **Gomes, B.**, Chorianopoulos, E., Kaya, Z., Gleissner, C.A., Katus, H.A., Bekerredjian, R. *Procedural advantages of a novel coronary stent design with ultra-thin struts and bioabsorbable abluminal polymer coating in an all-comers registry.* Postepy Kardiologii Interwencyjnej. 2018; 14(3):240-246.

Gomes, B., Geis, N. A., Leuschner, F., Meder, B., Konstandin, M., Katus H. A., Bekerredjian, R. *Periprocedural antibiotic treatment in transvascular aortic valve implantation.* J IntervCardiol. 2018; 31(6):885-890.

Gomes, B., Bekerredjian, R., Leuschner, F., Ehlermann, P., Schmack, B., Ruhparwar, A., Raake, P. W., Katus, H. A., Kreuzer, M. M., *First transfemoral aortic valve replacement for severe aortic valve regurgitation in a patient with a pulsatile-flow biventricular assist device.* ESC Heart Fail. 2019; 6(1):217-221.

Gomes, B., Hees, K., Hunde, H., Mereles, D., Meder B., Katus, H. A., Bekerredjian, R., *Prevalence and relevance of impaired left ventricular function in chronic moderate regurgitation of native aortic valves.* Acta Cardiol. 2020 Nov;75(7):613-620.

Gomes, B., Pilz, M., Reich, C., Leuschner, F., Konstandin, M., Katus, H.A., Meder, B., *Machine learning-based risk prediction of intrahospital clinical outcomes in patients undergoing TAVI.* Clin Res Cardiol. 2021 Mar;110(3):343-356.

Gomes, B., Ashley, E. *Machine learning of molecular profiling in clinical medicine.* New England Journal of Medicine, 2022 [in press].

Pre-prints

Gomes, B., Singh, A., O'Sullivan, J., Amar, D., Kostur, M., Haddad, F., Parikh, V., Meder, B., Ashley, E. *Genetic architecture of cardiac dynamic flow volumes.* [preprint]. 2022 October. Available from: <https://www.medrxiv.org/content/10.1101/2022.10.05.22280733v1>. doi: 10.1101/2022.10.05.22280733.

Manuscripts currently under review

Gomes, B., Singh, A., O'Sullivan, J., Amar, D., Kostur, M., Haddad, F., Salerno, M., Parikh, V., Meder, B., Ashley, E. *Genetic architecture of cardiac dynamic flow volumes.* Manuscript under review by Nature Genetics.

Gomes, B.*, Hedman, K.*, Kuznetsova, T., Cauwenberghs, N., Hsu, D., Kobayashi, Y., Ingelsson, E., Oxborough, D., George, K., Salerno, M., Ashley, E., Haddad, F., *The Allometry of Ventricular Remodeling based on Lean body Mass, a UK biobank study.* Manuscript under review by the European Journal of Applied Physiology. * co-first authors