Virtual Physiological Human – Cardiovascular Simulation and Experimentation for Personalised Medical Devices

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Abstract (for dissemination)	This document details the membership of the VPH-CaSE Supervisory Board and describes the institutions with which the individuals are associated. The role the Supervisory Board will play in the implementation of the VPH-CaSE training programme is detailed in the VPH-CaSE grant agreement. Section 2 provides the membership of the Supervisory Board in tabular form and Section 3 provides further details relating to each member of the Supervisory Board.
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12-Apr-15	3v0	AJN	Further information for two additional members added (version 2v0 was submitted to meet contractual deadline).

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1 INTRODUCTION

This document details the membership of the VPH-CaSE Supervisory Board and describes the institutions with which the individuals are associated. The role the Supervisory Board will play in the implementation of the VPH-CaSE training programme is detailed in the VPH-CaSE grant agreement.

Section 2 provides the membership of the Supervisory Board in tabular form and Section 3 provides further details relating to each member of the Supervisory Board.

2 SUPERVISORY BOARD MEMBERSHIP

Number	Name	Institution	Short Name	Acad / Ind / Clinic	MS	Department / Division / Laboratory
1	Prof. Wendy Tindale	Sheffield Teaching Hospitals NHS Trust, Sheffield	STH	Clinic	UK	Directorate of Medical Imaging and Medical Physics
2	Mr. Obi Agu	University College London Hospitals, London	UCLH	Clinic	UK	Vascular Services
3	Prof. dr. N.H.J. Pijls	Catharina Hospital Eindhoven	CHE	Clinic	NL	Cardiology
4	Prof. Pierre Croisille	University Hospital Saint Etienne	CHUSE	Clinic	FR	Radiology Department
5	Dr. M. Buijsrogge	University Medical Centre, Utrecht	UMCU	Clinic	NL	Dept. of cardiothoracic surgery
6	Mr. Roberto Ghidini	Medtronic Invatec	MDT	Ind	IT	
7	Agnes Malgouyres	Siemens	SIEMENS	Ind	FR	Division Imaging & Therapy
8	Mr. Stefano Reggiani	Sorin Group	SGI	Ind	IT	Cardiopulmonary Unit
9	Dr. ing. Peter Brands	Esaote Europe	ESAOTE	Ind	NL	
10	Prof. Diego Mantovani	Université Laval	LBBL	Acad	CAN	
11	Prof Jean-Philippe Verhoye*	University Hospital of Rennes	CICIT	Clinic	FR	Center for Clinical Investigation and Innovative Technology
12	Priv.-Doz. Dr. med. Hendrik von Tengg-Kobligk, M.D.*	University Hospital of Bern	UBERN	Clinic	CH	Institute for Diagnostic, Interventional and Pediatric Radiology
13	Dr. Francesco Burzotta*	Policlinico Agostino Gemelli	PUAG	Clinic	IT	Department of Cardiovascular Sciences

* These members have joined since the Grant Agreement was submitted, their role in the Network is provided in Section 3.

3 MEMBER DETAILS

1. Prof. Wendy Tindale[1]

Sheffield Teaching Hospitals NHS Foundation Trust (STH)

Prof. Tindale is Scientific Director of Medical Imaging and Medical Physics (MIMP) at Sheffield Teaching Hospitals NHS Foundation Trust which is a big, busy teaching hospital and one of the largest NHS Foundation Trusts in the UK. STH employs over 15000 staff caring for over a million patients each year. In collaboration with academic partners - the University of Sheffield and Sheffield Hallam University- STH plays a key role in the training and education of medical, nursing and dental students. Within the Trust, the Department of Medical Imaging and Medical Physics (MIMP) provides a wide range of services which include diagnostic imaging, medical physics and clinical engineering. This employs approximately 600 staff in a number of clinical and scientific professions.

Research interests include Nuclear imaging – SPECT/PET and service provision. Facilities include clinical facilities linked to medical imaging and medical physics. Research Infrastructure is delivered in partnership with the University of Sheffield as a member of the Insigneo Institute for *In-Silico* Medicine. STH has contributed as a partner in the following EC projects; FP7 Virtual Physiological Human Network of Excellence (VPH NoE), FP7 VPH-SHARE project, FP6 @neurIST project and FP5 GEMSS project.

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[1] Taylor JC, Froberg SA, Hillel PG, Harris AM, Tindale WB. *Correlation of left ventricular count rate with patient weight in Tc-99m myocardial perfusion imaging*. Nucl Med Commun. 2011 Apr;32(4):279-83.

EANM Physics Committee, Busemann Sokole E, Płachcínska A, Britten A; EANM Working Group on Nuclear Medicine Instrumentation Quality Control, Lyra Georgosopoulou M, Tindale W, Klett R. *Routine quality control recommendations for nuclear medicine instrumentation.* Eur J Nucl Med Mol Imaging. 2010 Mar;37(3):662-71.

Perkins AC, Gordon I, Read J, Ellis B; Professional Standards and Education Committee of the British Nuclear Medicine Society, Allen R, Clarke SE, Garner C, Hilson AJ, Frank JW, McCool D, Nicol A, Prescott MC, Ryan PJ, Shields RA, Tindale WB. *Training of staff for the delivery of PET/CT services in the UK.* Nucl Med Commun. 2006 Dec;27(12):1005-10.

2. Mr Obi Agu[2]

University College London Hospitals

Mr Obi Agu is a leading Consultant Vascular & Endovascular Surgeon. He lectures in surgery to postgraduates and undergraduates at the Royal Free & University College London medical school. The close link between the UCL lead (Dr. Diaz) and Mr. Agu will ensure that the translation link is strong and both will co-lead the clinical translation WP. UCLH is one of the largest NHS trusts in the United Kingdom. UCLH's mission is to deliver top-quality patient care, excellent education and world-class research. UCLH clinicians work closely with scientists at University College London.

The University College Hospital (UCH) Education Centre is the UK's most advanced medical training and clinical teaching facility, delivering the highest standards of preparation and continuing medical education. VPH-CaSE students will benefit from these facilities. Mr. Agu is involved in the CoMPLEX Doctoral Training Centre in UCL, a multidisciplinary training programme to tackle biological complexity from a mathematical point of view.

[2] Seamus C. Harrison, Anastasia Z. Kalea, Michael V. Holmes, Obi Agu and Steve E. Humphries. Genomic Research to Identify Novel Pathways in the Development of Abdominal Aortic Aneurysm. Cardiology Research and Practice, Volume 2012 (2012). doi:10.1155/2012/852829

Menezes, L. J., Kotze, C. W., Agu, O., Richards, T., Brookes, J., Goh, V. J., Groves, A. M. (2011). Investigating vulnerable atheroma using combined (18)F-FDG PET/CT angiography of carotid plaque with immunohistochemical validation. J Nucl Med, 52 (11), 1698-1703. doi:10.2967/jnumed.111.093724

Agu O, (Editors: Syed I, Keshtgar M) EMQs and Data Interpretation in Surgery (Vascular). Publishers: Hodder Arnold Health Sciences, London 2007

3. Prof. dr. Nico Pijls [3]

Catharina Hospital Eindhoven

The Catharina Hospital is a non-academic top clinical hospital with almost 700 beds and ~3500 employees. The Department of Cardiology and Cardiothoracic Surgery have a long standing record of innovative treatments and research.

Prof. dr. Nico Pijls is an interventional cardiologist and part-time professor at the University of Technology, Eindhoven (TU/e) with a research focus on coronary physiology. He has supervised numerous PhD students and intervention fellows.

Facilities include the catheterization Laboratory, R&D department, outpatient clinic.

CHE have been involved in several STW projects ("Assessment of the coronary circulation by guide-wire mounted sensors", "Smart flexible sensors for in-vivo coronary circulation diagnostics") and have also been involved in a CTMM project ("Circulating Cells").

[3] Tonino PA, De Bruyne B, Pijls NH, Siebert U, Ikeno F, van' t Veer M, Klauss V, Manoharan G, Engstrøm T, Oldroyd KG, Ver Lee PN, MacCarthy PA, Fearon WF; FAME Study Investigators. Fractional flow reserve versus angiography for guiding percutaneous coronary intervention. N Engl J Med. 2009 Jan 15;360(3):213-24.

Aarnoudse W, Van't Veer M, Pijls NHJ, Ter Woorst J, Vercauteren S, Tonino PAL, Geven MCF, Rutten MCM, van Hagen E, de Bruyne B, van de Vosse FN. Direct volumetric blood flow measurement in coronary arteries by thermodilution. J Am Coll Cardiol. 2007 Dec 11;50(24):2294-304.

Pijls NHJ, De Bruyne B, Peels K, Van Der Voort PH, Bonnier HJ, Bartunek J, Koolen JJ. Measurement of fractional flow reserve to assess the functional severity of coronary-artery stenoses. N Engl J Med. 1996 Jun 27;334(26):1703-8.

4. Pr. Pierre Croisille[4]

University Hospital Saint Etienne

Pr. Pierre Croisille is chairman of the Radiology and Nuclear Medicine Department, CHU Saint-Etienne, University of Lyon. The University Hospital of Saint-Etienne is part of the University of Lyon, the second largest scientific network in France, with 20 Universities, higher education schools and research centers

The network includes : 2 research centres (cancer research and neurosciences); 1 centre for clinical investigation, 22 INSERM units, 22 CNRS research units, 1 INRA unit. Research areas include: Cardiovascular research and organ protection, Inflammation, Neurology, Transplantation, Cancer research/onco-haematology, Infectious diseases, immunology, Nutrition.

Research and innovation are strategic cornerstones for the HCLs, with outputs including; 300 clinical trials conducted each year (including 16,000 patients in 2013), 1,500 studies carried out at the CHLs in 2013, 1,700 scientific publications in 2013.

The University Hospital network collaborates with 3 Medical Schools, 1 Faculty of Odontology, 1 Faculty of Pharmacy and 1 Technical Institute for Rehabilitation. The University of Lyon Network trains 129 000 students, with 11 500 researchers.

[4] "Thuny F, Lovric D, Schnell F, Bergerot C, Ernande L, Cottin V, Derumeaux G, **Croisille P**. Quantification of Myocardial Extracellular Volume Fraction with Cardiac MR Imaging for Early Detection of Left Ventricle Involvement in Systemic Sclerosis. Radiology 2014; 131280.

Mewton N, Thibault H, Roubille F, Lairez O, Rioufol G, Sportouch C, Sanchez I, Bergerot C, Cung TT, Finet G, Angoulvant D, Revel D, Bonnefoy-Cudraz E, Elbaz M, Piot C, Sahraoui I, **Croisille P**, Ovize M. Postconditioning attenuates no-reflow in STEMI patients. Basic Res Cardiol 2013; 108: 383.

Viallon M, Mewton N, Thuny F, Guehring J, O'Donnell T, Stemmer A, Bi X, Rapacchi S, Zuehlsdorff S, Revel D, **Croisille P**. T2-weighted cardiac MR assessment of the myocardial area-at-risk and salvage area in acute reperfused myocardial infarction: comparison of state-of-the-art dark blood and bright blood T2-weighted sequences. J Magn Reson Imaging 2012; 35: 328-339.

5. Dr. M.P. Buijsrogge[5]

University Medical Centre Utrecht (UMCU)

Dr. M.P. Buijsrogge, MD, PhD, is a cardiothoracic surgeon at UMCU which is the most important referral hospital for mechanical circulatory support in the Netherlands. Prof. dr. J.R. Lahpor (recently retired) was one of the early adopters of this new treatment method for cardiac failure, and made the group of cardiothoracic surgery of UMCU a leader in this field. UMCU implants 30+ cardiac assist devices annually.

Key research areas include; Cardiothoracic surgery, (non-invasive) cardiac imaging, heart failure, LVAD support, heart and lung transplantation.

Research and training programmes include; Facilitated Cardio-thoracic (bypass) surgery, Eurostars EUREKA (ESTAR10210), Minimally invasive Cardio-thoracic (bypass) surgery, EuroTrans-BIO (ETB110014).

[5] Single-centre experience of 85 patients with a continuous-flow left ventricular assist device: clinical practice and outcome after extended support. Lok SI, Martina JR, Hesselink T, Rodermans BF, Hulstein N, Winkens B, Klöpping C, Kirkels JH, Doevendans PA, Ramjankhan F, de Weger RA, de Jonge N, Lahpor JR. Eur J Cardiothorac Surg. 2013 Sep;44(3):e233-8.

Pump flow estimation from pressure head and power uptake for the HeartAssist5, HeartMate II, and HeartWare VADs. Pennings KA, Martina JR, Rodermans BF, Lahpor JR, van de Vosse FN, de Mol BA, Rutten MC. ASAIO J. 2013 Jul-Aug;59(4):420-6.

Functional and haemodynamic recovery after implantation of continuous-flow left ventricular assist devices in comparison with pulsatile left ventricular assist devices in patients with end-stage heart failure. Pruijsten RV, Lok SI, Kirkels HH, Klöpping C, Lahpor JR, de Jonge N. Eur J Heart Fail. 2012 Mar;14(3):319-25

6. Mr. Roberto Ghidini

Medtronic Invatec

Mr. Roberto Ghidini (MSc in Mechanical Engineering) is R&D Director at Medtronic Invatec, Italy. Medtronic, Inc., headquartered in Minneapolis, is the global leader in medical technology, Invatec S.p.A. (Roncadelle, BS, Italy), part of Medtronic Endovascular Therapies division, is a centre of excellence for the global medical technology company's peripheral vascular business, with an increased focus on high-tech research and development.

Mr. Ghidini has 24 Years experience in R&D, 11 in medical devices for vascular interventions. 80% of his time is dedicated to people management and supervising activities.

Facilities include; R&D and process engineering capability, as well as the manufacturing and OPS infrastructure, polymer compounding, extrusion, balloon-forming, plastic overmoulding, radiofrequency, numerical simulation and polymers science and technology. Stents, balloon catheters and other angioplasty product development.

Research expertise includes roles as associated partner in the Marie Curie Initial Training Networks (ITN) MeDDiCA (FP7-PEOPLE-ITN-2008 - MeDDiCA No 238113) and as a full partner in FP7-ICT-2009-6 Grant Agreement No 248801 – Real Time Simulation for Safer vascular Stenting (RT3S).

7. Ms. Agnes Malgouyres

Siemens

Siemens Healthcare, a sector of Siemens AG, is a leading healthcare solutions provider worldwide. The company is known for bringing together innovative medical technologies, healthcare information systems, management consulting, and support services. The portfolio of innovative products and professional services ranges from clinical and administrative IT solutions, diagnostic imaging systems, laboratory diagnostics, and hearing instruments.

As of 2011 Siemens invested a total of €3.925 billion in research and development (equivalent to 5.3% of revenues), about 19% of which concerned Healthcare related R&D.

In the context of imaging and therapy as a whole, Siemens is one of the industry's pioneers. To continue building on this, Imaging & Therapy Systems is increasing investment in research and development. The goal is to boost the links between imaging and therapy for the benefit of the patient. With its innovative imaging IT solutions, the Division of Imaging and Therapy ensures that the correct information for diagnosis and therapy is always quickly available amidst the continuously growing volume of medical imaging data.

Siemens is responsible for many technical innovations, patents etc. and these have been subjected to published evaluations across the globe. Its technologies have been used to support a breadth of research, including the cardiovascular area that is of interest to VPH-CaSE.

8. Mr. Stefano Reggiani

Sorin Group

Mr. Stefano Reggiani, MSc in Materials Engineering is R&D Engineer at SORIN GROUP ITALIA (SGI), a global medical device company and a leader in the treatment of cardiovascular diseases. The Company develops, manufactures and markets medical technologies for cardiac surgery.

The Cardiopulmonary Unit (Mirandola, MO, Italy) has fully equipped blood testing laboratory, biochemical laboratory and the manufacturing plant (components for extracorporeal cardiopulmonary bypass).

Sorin has expertise in previous research projects funded by MIUR (the Italian Ministry for University, Education and Research) and Regione Emilia Romagna. SGI devices have been evaluated and cited in several publications in the scientific literature, with over 20 patented technologies.

9. Dr. ing. Peter Brands

Esaote Europe

Dr. ing. Peter Brands is head of the advanced projects group and will support ESRs doing secondments at Esaote. Peter Brands has extensive experience with R&D project management, he was coordinator of several EUREKA projects, was WP leader in FP6 SHAPES and FP7 ARCH and is coordinator of the ongoing FP7 FULLPHASE IP project on photoacoustic imaging.

ESAOTE Europe, established as Pie Medical in 1976, is a leading research company in the EU in the field of ultrasound systems for medical applications. ESAOTE Europe is part of the worldwide ESAOTE Group. Innovative US theories and signal processing resulted in the arterial analyser (ART.LAB) research system for non-invasive and accurate assessment of arterial wall properties.

ESAOTE Europe has highly specified know-how on the characterisation of ultrasound fields (beam profiling), ultrasound technology and ultrasound system design. The product portfolio consists of ultrasound scanners and transducers. Research and development is realized at the main office of ESAOTE Europe in Maastricht (165 employees).

10. Prof. Diego Mantovani[6]

Université Laval

Prof. Diego Mantovani, PhD is director of the Laval University Lab for Biomaterials and Bioengineering (LBBL), an academic research Laboratory devoted to original and innovative research for improving the performances of commercial medical devices and investigating innovative strategies susceptible to lead to the next generation of regenerated organs and tissue.

Research areas include; Plasma reactor for surface modification; Surface Characterisation, XPS, AFM, FTIR, SEM; Micromechanical systems; Bioreactors for tissue perfusion; Plasturgy and Metallurgy.

LBBL is a member of Canada NSERC-CREATE Project in Regenerative Medicine, 7 University and 1,6 M$ Budget over 6 years for training high qualified people in regenerative medicine. Training of more than 40 Master and 30 PhD Candidate, and 15 Postdoctoral fellows.

Presently supervisor of 15 PhD students, 6 postdoctoral fellows, and 8 undergraduate students. 40% of these students beneficiate from a merit scholarship from their government or a private Foundation. 6 PhD students are registered in a joint PhD student co-supervised with a French or Italian University and co-director (Paris, Bordeaux and Rome).

[6] M. Moravej*, M. Fiset, and D. Mantovani. Electroformed Pure Iron as a New Biomaterial forDegradable Stents: In Vitro Degradation and Preliminary Cell Viability Studies, Acta Biomater., 6, 5, 1843–1851, 2010; doi : 10.1016/j.actbio.2010.01.008.

F. Couet, S. Meghezi, D. Mantovani. Fetal Developement, Mechanobiology and Optimal Control Processes Can Improve Vascular Tissue Regeneration in Bioreactors: An Integrative Review, Med. Eng. Phys., 34, 3, 269-278, 2012; doi : 10.1016/j.medengphy.2011.10.009.

F. Lewis*, P. Chevallier*, S. Turgeon*, M. Cloutier*, J.J. Pireaux, M. Tatoulian, and D. Mantovani. Influence of the 316L Stainless Steel Interface on the Stability and Barrier Properties of Plasma Fluorocarbon Films, ACS Appl. Mater. Interfaces, 3, 7, 2323-2331, 2011; doi : 10.1021/am200245d.

11. Prof Jean-Philippe Verhoye[7]

University Hospital of Rennes

The CIC-IT has a renowned know-how in intelligent, communicating implantable cardiac prostheses, as well as in monitoring systems dedicated to pediatrics and anesthesia. Its missions are at the junction between technology and patients. They concern:

- Clinical evaluation: design and coordination of multicentre studies, development of specific methodologies, contribution to clinical recommendation drafting.
- Technological Innovation: identification of clinical needs, definition of new concepts, support for the development of device and method prototypes stemming from upstream research, development of new industrial products, Start-up incubation.

Evaluation and innovation missions are carried out in contact with the pioneer partners of the CIC-IT: Sorin Group, Biotrial, Deltamed and through contracts with companies such as Medtronic, St Jude Medical, Boston Guidant, or Biotronik.

CICIT will interact closely with ESR projects hosted by Beneficiaries ANSYS and Therenva, providing a clinical perspective for these projects.

[7] Anselmi A, Harmouche M, Verhoye JP, Corbineau H, Mariano C, Maasrani M, Drochon A. Increase in Coronary Microvascular Resistances after Recanalisation with Drug-Eluting Stent. Comput Methods Biomech Biomed Engin. 2014;17 Suppl 1:12-3.

Brunet-Bernard A, Marechaux S, Fauchier L, Guiot A, Fournet M, Reynaud A, Schnell F, Leclercq C, Mabo P, Donal E. Combined Score Using Clinical, Electrocardiographic, and Echocardiographic Parameters to Predict Left Ventricular Remodeling in Patients Having Had Cardiac Resynchronization Therapy Six Months Earlier. Am J Cardiol. 2014 Jun 15;113(12):2045-51.

Lucon A, Oger E, Bedossa M, Boulmier D, Verhoye JP, Eltchaninoff H, Iung B, Leguerrier A, Laskar M, Leprince P, Gilard M, Le Breton H. Prognostic Implications of Pulmonary Hypertension in Patients with Severe Aortic Stenosis Undergoing Transcatheter Aortic Valve Implantation Study from the France 2 Registry. Circulation-Cardiovascular Interventions. 2014 Apr;7(2):240-7.

12. Priv.-Doz. Dr. med. Hendrik von Tengg-Kobligk, M.D.[8]

University Hospital of Bern

Priv.-Doz. Dr. med. Hendrik von Tengg-Kobligk works as a radiologist in the department of radiology at the University Hospital of Bern, the Inselspital. He worked for several years in the radiology department of Radiology in Heidelberg and at the German Cancer Research Center (DKFZ) and gathered imaging research experiences at the Clinical Center at NIH, USA and The Ohio State University. He finished his doctoral thesis on contrast enhanced MR Angiography in 2003. Since 2005 he acted as leader of the vascular imaging group at DKFZ and then continued with his group at the University Hospital of Heidelberg in the middle of 2009. He finished his Habilitation in 2012 in the field of vascular imaging and image processing. He acquired grants from W.L. Gore & Ass. , Bracco S.p.A. as well as the German Research foundation (DFG) and the EU (FP7, euHeart). He was director of the Imaging Core-Lab servicing for the W.L. Gore sponsored ADSORB study.

His publication list contains >110 PubMed listed publications. He was director of the Imaging Core-Lab servicing for the W.L. Gore sponsored ADSORB study.

UBERN will interact closely with ESR projects hosted by Beneficiaries ANSYS and Therenva, providing a clinical perspective for these projects.

[8] Kotelis D, Brenke C, Wörz S, Rengier F, Rohr K, Kauczor HU, Böckler D, **von Tengg-Kobligk** H. Aortic morphometry at endograft position as assessed by 3D image analysis affects risk of type I endoleak formation after TEVAR. Langenbecks Arch Surg. 2015 Feb 22. [Epub ahead of print]

Rengier F, Delles M, Eichhorn J, Azad YJ, **von Tengg-Kobligk** H, Ley-Zaporozhan J, Dillmann R, Kauczor HU, Unterhinninghofen R, Ley S. Noninvasive 4D pressure difference mapping derived from 4D flow MRI in patients with repaired aortic coarctation: comparison with young healthy volunteers. Int J Cardiovasc Imaging. 2015 Feb 3.

Erhart P, Hyhlik-Dürr A, Geisbüsch P, Kotelis D, Müller-Eschner M, Gasser TC, **von Tengg-Kobligk** H, Böckler D. Finite Element Analysis in Asymptomatic, Symptomatic, and Ruptured Abdominal Aortic Aneurysms: In Search of New Rupture Risk Predictors. Eur J Vasc Endovasc Surg. 2014 Dec 24. pii: S1078-5884(14)00637-6. doi: 10.1016/j.ejvs.2014.11.010. [Epub ahead of print]

13. Dr. Francesco Burzotta[9]

Policlinico Agostino Gemelli

The unit of Cardiologia 2 is a clinical ward belonging to the Department of Cardiovascular Sciences of the Catholic University of the Sacred Heart located at the 8th floor of the Agostino Gemelli University Hospital. This ward is dedicated to manage patients with cardiovascular diseases who have to undergo advanced percutaneous treatment in the catheterization laboratories. The volume of patients managed by PUAG in the catheterization laboratories is the largest in this Italian Region. Due to the clinical research attitude of PUAG, the group has worked to innovate the percutaneous treatment of patients with complex coronary artery lesions. Research has also covered the field of peripheral vascular interventions and structural heart interventions.

In particular, PUAG have designed and realized a series of studies aimed at reducing the risk of vascular complications in various interventions, at reducing the risk of no-reflow in patients with acute coronary syndromes and at improving the management of patients with bifurcated coronary lesions. PUAG also have responsibility for education of Cardiology Fellows and tutoring of Medical Degree and PhD students.

PUAG will interact closely with ESR projects hosted by Beneficiary POLIMI, providing a clinical perspective for these projects. Visiting researchers will have the opportunity to be exposed to PUAG projects and educational appointments under the mentoring of PUAG staff. These activities will provide a valuable learning experience that will complement their training activities. The catheterization laboratories (two standard interventional cath labs and one hybrid operative room) are fully equipped with all the last available technologies and most contemporary percutaneous techniques are practiced on a routine basis. Original research protocols are continuously promoted by PUAG staff and VPH-CaSE students will have the opportunity to be involved in such activities.

[9] **Burzotta F**, Nerla R, Pirozzolo G, Aurigemma C, Niccoli G, Leone AM, Saffioti S, Crea F, Trani C. Clinical and procedural impact of aortic arch anatomic variants in carotid stenting procedures. Catheter Cardiovasc Interv. 2015 Apr 2. doi: 10.1002/ccd.25947. [Epub ahead of print]

Burzotta F, Dato I, Trani C, Pirozzolo G, De Maria GL, Porto I, Niccoli G, Leone AM, Schiavoni G, Crea F. Frequency domain optical coherence tomography to assess non-ostial left main coronary artery. EuroIntervention. 2015 Jan;10(9):e1-8. doi: 10.4244/EIJV10I9A179.

Prati F, Romagnoli E, Valgimigli M, **Burzotta F**, De Benedictis M, Ramondo A, Mehran R, Stella PR. Randomized comparison between 3-month Cre8 DES vs. 1-month Vision/Multilink8 BMS neointimal coverage assessed by OCT evaluation: the DEMONSTRATE study. Int J Cardiol. 2014 Oct 20;176(3):904-9. doi: 10.1016/j.ijcard.2014.08.031. Epub 2014 Aug 13.

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