



**REVAMMAD – REtinal Vascular Modelling, Measurement and Diagnosis**

**5<sup>th</sup> Workshop:  
‘Results, Exploitation and Careers’  
Padova 31 August – 2 September 2015  
MuSME (Via S. Francesco, 94, Padova)**

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## Schedule

5 <sup>th</sup> REVAMMAD workshop				
2015				
	Monday 31 August	Tuesday 1 September	Wednesday 2 September	
Location	MuSME			
9.00 – 9.15	Welcome address			
09.15 – 10.00	Marco Morales	Andrew Hunter	Tullio Vardanega	
10.00 – 11.00	Giuliano Barbaro	Tim Secomb		
<b>COFFEE BREAK*</b>				
11.30 – 12.30	ESRs presentations	Giovanna Guidoboni		
<b>LUNCH*</b>				
14.00 – 15.00	Management meeting	Maria Pelizzo		
15.00 – 16.00	Phil Assheton (ESRs)	PIs meeting (future research avenues)		Lucia Carichino & Simone Cassani
<b>COFFEE BREAK*</b>				
16.30 – 17.00	Phil Assheton (ESRs) (cont'd)	PIs meeting (future research avenues) (cont'd)		Barbara Vianello
17.00 – 17.30				Viviana Gialain
17.30 – 18.00				
18.00 – 20.00	Il Bo – Guided Tour	MuSME – Guided Tour		
20.00	Workshop dinner	Free		

\*Coffee breaks and lunches at MuSME

**Monday 31 August 2015**

- 09.00 Welcome address
- 09.15 Analysis of visual function in patients with central vision loss  
**Mr Marco Morales**, CenterVue, Padua
- 10.00 Confocal retinal imaging: state of the art and future development of tools for quantitative / qualitative analysis  
**Giuliano Barbaro**, CenterVue, Padua
- 11.00 Coffee break
- 11.30 REVAMMAD ESRs short presentations (5 min each)  
ESR 1.1. Matteo Aletti  
ESR 1.2 Weiwei Xiang  
ESR 1.3 Anastasiia Neganova  
ESR 2.1 Francesco Calivá  
ESR 2.2 Roberto Annunziata  
ESR 2.3 Jeff Wigdahl  
ESR 2.4 Pedro Guimarães  
ESR 2.5 Evangelia Kotsiliti  
ESR 3.1 Georgios Leontidis  
ESR 3.3 Giovanni Ometto  
ESR 3.4 Carlos Hernandez Matas  
ESR 4.1 Daniele Cortinovis – introduction to group  
(*ESR 3.2 Sergio Crespo Garcia is not attending the meeting*)
- 12:30 Lunch
- 14.00 Management meeting  
(ESRs invited as observers but this is not compulsory)
- 15.00 Parallel sessions
- a) PIs – Future research avenues discussion
- b) ESRs - Experimental methods training  
**Dr Phil Assheton**, Maths and Statistics Centre Adviser, University of Lincoln
- 16.00 Coffee Break
- 16.30 Parallel sessions (cont'd)
- 18.00 Close
- 18.00 Guided Tour – Il Bo
- 20.00 Workshop dinner (La Finestra di Via Tadi)

**Tuesday 1 September 2015**

- 9.15            How to build a research career  
                  Lead: **Prof Andrew Hunter**, UoL
- 10.00            Modeling oxygen transport, structural adaptation and angiogenesis in the microcirculation  
                  **Prof Timothy W. Secomb**, Department of Physiology, Department of Mathematics and Program in Applied Mathematics, University of Arizona
- Abstract:  
                  The delivery of an adequate oxygen supply to tissue is the most critical functional requirement that must be met by the vascular system. Tissue oxygen levels are sensitively dependent on the structure and flow distribution in the microcirculation. I will first review theoretical approaches for analyzing oxygen transport. Then I will present theoretical models for structural adaptation of vessel diameters and for angiogenesis, showing how vascular responses to hemodynamic signals (pressure and wall shear stress) and metabolic and growth signals dependent on local oxygen levels can lead to the generation of network structures that meet the metabolic needs of the tissue. Finally, I will discuss the application of these approaches to the retinal microcirculation.
- 11.00            Coffee break
- 11.30            Modeling of ocular blood flow: mathematical challenges and clinical relevance  
                  **Prof Giovanna Guidoboni**, Department of Ophthalmology, School of Medicine, Indiana University-Purdue University (IUPUI), Indianapolis & Gutenberg Chair, University of Strasbourg
- Abstract:  
                  The eye is the only place in the human body where blood flow and systemic vascular features can be observed and measured easily and non-invasively down to the capillary level. Numerous clinical studies have shown correlations between alterations in ocular blood flow and ocular diseases (e.g. glaucoma, age-related macular degeneration, diabetic retinopathy), neurodegenerative disorders (e.g. Alzheimer's disease, Parkinson's disease) and other systemic pathologies (e.g. hypertension, diabetes). Thus, deciphering the mechanisms governing ocular blood flow could be the key to the use of eye examinations as a non-invasive approach to the diagnosis and continuous monitoring for many patients. However, many factors influence ocular hemodynamics, including intraocular pressure (IOP), arterial blood pressure and blood flow autoregulation, and it is extremely challenging to single out their individual contributions during clinical and animal studies. In the recent years, we have been developing mathematical models to aid the interpretation of clinical data. In this talk, we will present models describing the blood flow in the macro and micro-vasculature of the retina and optic nerve head, accounting for the IOP-induced deformation of the vessel walls. Results will show how the synergy between mathematical modeling and clinical data allowed to estimate the

relative contribution of IOP, arterial blood pressure and blood flow autoregulation on tissue perfusion. The mathematical challenges embodied in the models will also be discussed, and they include fluid-structure interactions and multiple scales in space and time.

12.30 Lunch

14.00 Confocal microscopy  
**Dr Maria Pelizzo**, CNR Institute for Photonics and Nanotechnology, Padua

15.00 Invited PhD students presentations

**Lucia Carichino**, IUPUI: Modeling of central retinal vessel hemodynamics coupled with lamina cribrosa deformation

Abstract: Central retinal vessel hemodynamics plays a crucial role in several ocular diseases and clinical observations show significant correlations between alterations in hemodynamics and vision impairment. However, the mechanisms giving rise to these correlations are not yet fully understood. The central retinal vessels pass through the lamina cribrosa, a collagen structure in the optic nerve that helps maintaining the pressure difference between the intraocular pressure inside the eye globe and the cerebrospinal fluid pressure in the retrobulbar region. In this talk I will present the main challenges encountered in developing a mathematical model that describes the fundamental mechanisms governing the blood flow in the central retinal vessels, that couples the central retinal vessels hemodynamics with the lamina cribrosa deformation, and that can be used to interpret clinical data. The model requires sophisticated mathematical techniques, including fluid structure interaction and multi-scale coupling.

**Simone Cassani**, IUPUI: Ocular circulation: a mathematical model accounting for compliant/collapsible vessels and autoregulation

Abstract: "Numerous clinical studies have shown correlations between alterations in retinal blood flow and ocular diseases, neurodegenerative diseases and other systemic diseases. In this talk a mathematical model describing the blood flow in the retinal macro- and micro-vasculature will be presented. The model accounts for the Intraocular pressure(IOP)-induced deformation of the vessel walls and the autoregulation of blood flow in the retina. The influence of aqueous humor formation on IOP will be considered. Two different modeling approaches for compressible/collapsible vessels will be discussed."

16.00 Break

16.30 Maria S. Curie Actions overview  
**Barbara Vianello**, International Research Office, University of Padua

17.30 Marie S. Curie Individual, how to write a proposal and evaluation  
**Viviana Gialain**, International Research Office, University of Padua

18.00 Close

18.00 Guided tour: MuSME

***Wednesday 2 September 2015***

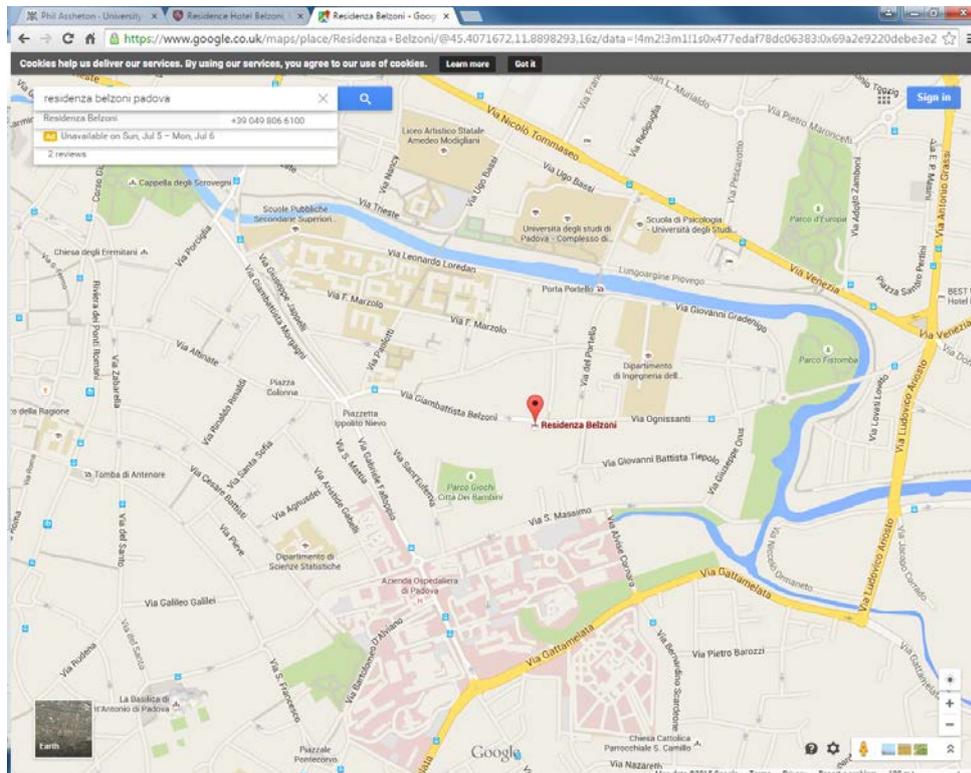
9.15 Research grant session  
Prof Tullio Vardanega, Department of Mathematics, University of Padua

11.00 Break and close

## Accommodation

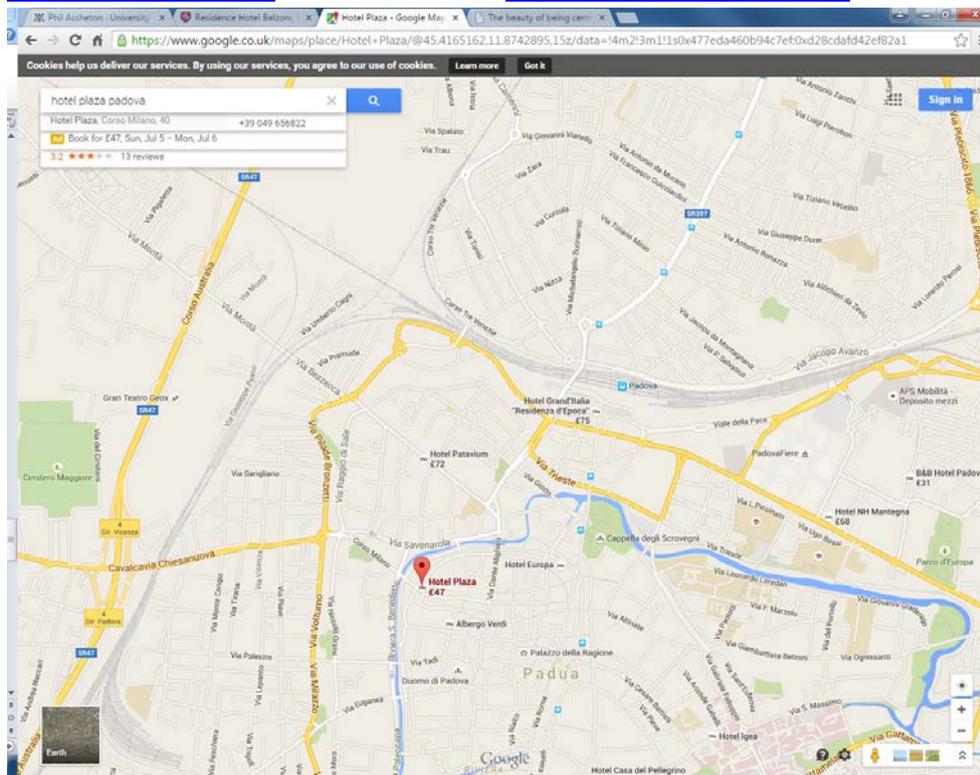
Residenza Belzoni, Via G. Belzoni 146 – 35121, Padova, Italy

[office@residenzabelzoni.it](mailto:office@residenzabelzoni.it) +39 049 8066100 <http://www.residenzabelzoni.it/>



A small group will be staying at the Hotel Plaza, Corso Milano, 40, Padova, Italy

[info@plazapadova.it](mailto:info@plazapadova.it) +39 049 656822 <http://www.plazapadova.it/>

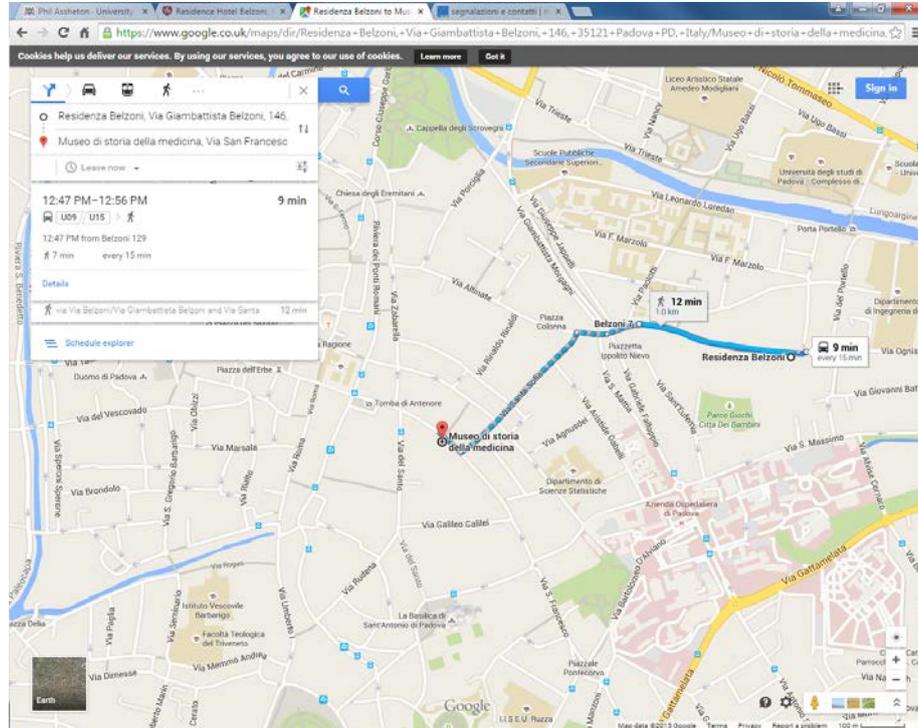


## Venue

MuSME: Museo di storia della medicina e della salute

Ospedale di San Francesco Grande, Via S. Francesco, 94, 35121, Padova, PD, Italy

From Residenza Belzoni:



From Hotel Plaza:

