

# **1<sup>st</sup> UFRJ- UoB Symposium on Microbiology and Immunology**

**September 24<sup>th</sup> 2020**

**14:00-17:00 GMT**

**10:00- 13:00 Brazil time**

## **University of Birmingham speakers**

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**Prof. Willem van Schaik, Title: Antibiotic resistance in microbiomes.** Summary: Main research interests are the characterization of the mechanisms by which commensal bacteria evolve to become multi-drug resistant opportunistic pathogens and the metagenomic analysis of the reservoir of antibiotic resistance genes ('the resistome') in complex microbiomes.

<https://www.birmingham.ac.uk/staff/profiles/microbiology-infection/van-schaik-willem.aspx>

**Dr. Felicity De Cogan, Title: Developing novel surface to prevent the Spread of Infection.** Summary: We have developed a new technology which incorporates biocides into plastics – post product manufacture to generate self-cleaning surfaces. Recently we have demonstrated that the new technology works against SARS-CoV-2, fungi, bacteria and that the surfaces can be used as a method of circumventing antimicrobial resistance. The surfaces have the killing efficacy on bacteria which are resistant to the biocide when tested in solution as the wild type bacteria.

<https://www.birmingham.ac.uk/staff/profiles/microbiology-infection/decogan-felicity.aspx>

**Dr. Joan Geoghegan, Title: Defining the molecular basis of Staphylococcus aureus colonisation and pathogenesis.**

Summary: My team's research aims to elucidate the mechanisms used by the Gram-positive bacterium Staphylococcus aureus to establish colonisation and infection in humans. We study the molecular basis of staphylococcal interaction with host proteins and cells and strategies used by the bacterium to resist clearance by the immune system and interference from other microbes.

**Dr. C. M. Santosh Kumar (Dr Peter Lund's Lab) Zebrafish model system for investigating role of stress proteins in Tuberculosis.** Summary: Our group studies bacterial stress responses using a range of methods including molecular genetics, biochemistry, high throughput approaches such as traDIS and RNAseq, and lab-based evolution. One of current projects involves elucidating the role of mycobacterial chaperonins in the establishment and progression of tubercular disease. We have established a zebrafish infection model, which forms human-like granulomas, the hallmark feature of tuberculosis establishment, upon infection with Mycobacterium marinum, which is closely related to human pathogen M. tuberculosis. We demonstrated that the non-essential chaperonin, Cpn60.1 is involved in the formation of granulomas and thereby in establishment and persistence of mycobacterial infection.

**Dr. Michelle Buckner, Title: Can we target bacterial plasmids to reduce AMR?** Summary: My group works on understanding the biology of AMR plasmids, and using this knowledge to develop strategies to reduce the prevalence of AMR. We use a medium-throughput screening system to identify and then characterise compounds which inhibit plasmid conjugation and/or plasmid persistence.

<https://www.birmingham.ac.uk/staff/profiles/microbiology-infection/buckner-michelle.aspx>

## UFRJ speakers

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**Elvira Saraiva (ORCID: 0000-0002-6388-5286)**

Full Professor of the Immunology Department of the Microbiology Institute. My group is interested in studying the interaction of innate immune cells (neutrophils, macrophages and mast cells) with different pathogens, evaluating the release of extracellular DNA traps (originally described as extracellular neutrophil traps - NETs). These structures, composed of chromatin decorated with different proteins, ensnare and kill microorganisms.

Some of our work in the subject (DOI): 10.1073/pnas.0900226106; 10.1038/srep18302; 10.3389/fimmu.2017.00523; 10.1038/s41598-020-59486-2; 10.1016/j.dci.2018.01.012.



**Fernanda Abreu (ORCID: 0000-0003-2356-5840)**

The Laboratório de Biologia Celular e Magnetotaxia (LaBMax) is a laboratory led by Professor **Fernanda Abreu** with a focus on magnetotactic bacteria. The research conducted at LaBMax has two pillars: environmental cell microbiology and nanobiotechnology. The group has experience in examining the diversity and the ecology of magnetotactic bacteria in mesophilic and extreme environments. The expertise in cell biology and microscopy techniques has led to publications on the characterization of cultivated and uncultivated magnetotactic prokaryotes. More recently, we have advanced into the development of large-scale cultivation of those organisms and further to the biotechnological applications of their intracellularly produced magnetic nanoparticles – or magnetosomes. The current projects involve the formulation of magnetosome-derived nanodrugs targeting bacterial, fungal, and parasitic infections as well as the investigation of the potential of the nanomagnets in environmental remediation. We are looking forward to interacting with members of the Institute of Microbiology and Infection at UoB. Our main interest would be tracing collaborations in fighting antibiotic resistance and biofilm targeting with magnetic nanoformulations.



**Maria Bellio (ORCID: 0000-0002-3360-2740)**

**Dr. Bellio** is an Associate Professor at the Department of Immunology, Institute of Microbiology Paulo de Góes, Federal University of Rio de Janeiro (IMPG - UFRJ), Brazil. She completed her BSc in Biology (Genetics) from UFRJ, and performed the experimental work of her PhD thesis in Professor Kourilsky's laboratory at the Pasteur Institute of Paris, France (1991-1994), studying the recognition of Ag-MHC and SAg-MHC complexes by the TCR. Back to Brazil, after obtaining her PhD in Sciences (Immunology) from UFRJ, she was awarded a CNPq Postdoctoral Fellowship and started to study the immunomodulatory functions of molecules derived from *T. cruzi*, in the laboratory of Professor George dos Reis, at the IMPG - UFRJ. In 1997, she became an Assistant Professor at UFRJ and started her independent research group, which was the first to identify a parasite-derived TLR4 agonist, the glycoinositol phospholipid molecule (GIPL) of *T. cruzi*. Her main interest is in CD4 T cell biology and her team is currently dedicated to understanding the development and control of T cell responses to infection with intracellular pathogens, such as *Trypanosoma cruzi* and Zika virus (ZIKV).

Recent publications:

Oliveira A.C., et al. 2017. Crucial role for T cell-intrinsic IL-18R-MyD88 signaling in cognate immune response to intracellular parasite infection. *Elife* 2017 Sep 12;6. pii:e30883. doi: 10.7554/eLife.30883.

Gomes-Neto, J. F. et al. 2018. Vaccination with recombinant filamentous fd phages against parasite infection requires TLR9 expression. *Front. Immunol.* 2018 May 29;9:1173. doi: 10.3389/fimmu.2018.01173.

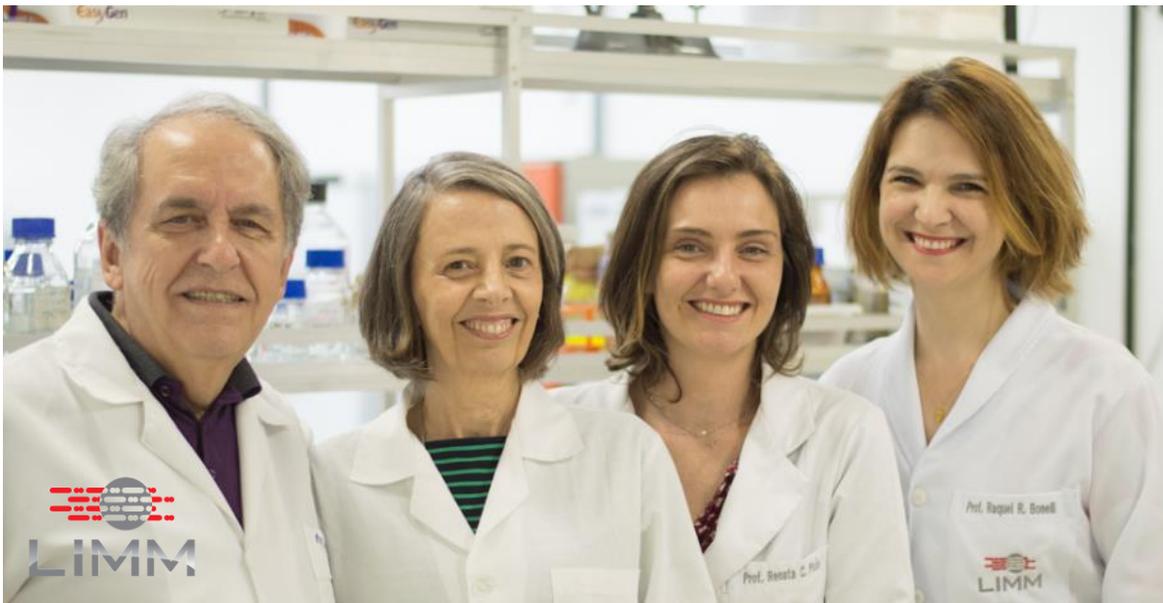
Barbeito-Andrés J. et al. 2020. Congenital Zika syndrome is associated with maternal protein malnutrition. *Sci Adv.* 2020 Jan 10;6(2):eaaw6284. doi: 10.1126/sciadv.aaw6284.

Barbosa CH et al. (submitted). T-Cell Intrinsic IL-18R/MyD88 Signaling Controls the Generation of Cytotoxic CD4 + T Cell Response. *CELL-REPORTS-D-19-01473*. Preprint available at: <http://dx.doi.org/10.2139/ssrn.3379972>



**Agnes Figueiredo (ORCID: 0000-0001-8229-6957)**

**Agnes Figueiredo** has a pharmacy degree from Fluminense Federal University, in Rio de Janeiro. She earned a PhD in Sciences (Microbiology) from the Federal University of Rio de Janeiro in 1982. She was a postdoctoral fellow at The Rockefeller University in Alexander Tomasz's Lab, from 1989 to 1991. In 1992, she became an Adjunct Professor at Federal University of Rio de Janeiro where she remains until now as Full Professor. She was also a Visiting Professor at Skirball Institute of Biomolecular Medicine, New York University, in the Laboratory of Richard Novick from 1999 to 2001. Agnes Figueiredo was head of the Department of Medical Microbiology and later Director of the Paulo de Góes Institute of Microbiology, Federal University of Rio de Janeiro, from 2006 to 2010. She was also the coordinator of the Graduate Program in Sciences (Microbiology) from March 2018 to May 2020. Agnes Figueiredo is now head of the Laboratory of Molecular Biology of Bacteria in the same Institute. Her research interests are in the studies on the molecular and genomic mechanisms involved in the specialization (evolution) of epidemic clones of methicillin-resistant *S. aureus* (MRSA) as successful hospital-associated and community-acquired pathogens. She has developed numerous collaborations with researchers around the world, having more than three thousand citations



### Laboratory for Investigation in Medical Microbiology

**Sérgio Eduardo Longo Fracalanza (ORCID 0000-0003-0985-9770)**

**Beatriz Meurer Moreira (ORCID: 0000-0002-1650-1382)**

**Renata Cristina Picão (ORCID: 0000-0001-6507-0905)**

**Raquel Regina Bonelli (ORCID: 0000-0003-4537-5458)**

The Laboratory for Investigation in Medical Microbiology (LIMM) is a research and teaching facility run by four Professors: Sergio Eduardo Longo Fracalanza, Beatriz Meurer Moreira, Raquel Regina Bonelli and Renata Cristina Picão. Since its creation, in 2014, LIMM's group produced about 70 peer reviewed papers, trained 24 M. Sc. students, 12 PhD students, and have 3 more PhD seeking students under training, and 8 postdoc fellows. Our main research interest is AMR dissemination on gram-negative bacteria. The emphasis of each researcher is complimentary to achieve a one health perspective including the human (Beatriz), animal (Raquel) and environmental (Renata) spheres. Our projects are mainly devoted to assessing the most frequent AMR bacteria, especially those of high risk, the antimicrobial resistance determinants involved, their genetic support, and mechanisms for dissemination between different bacterial hosts and settings.

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