

THE

IMMUNOLOGS

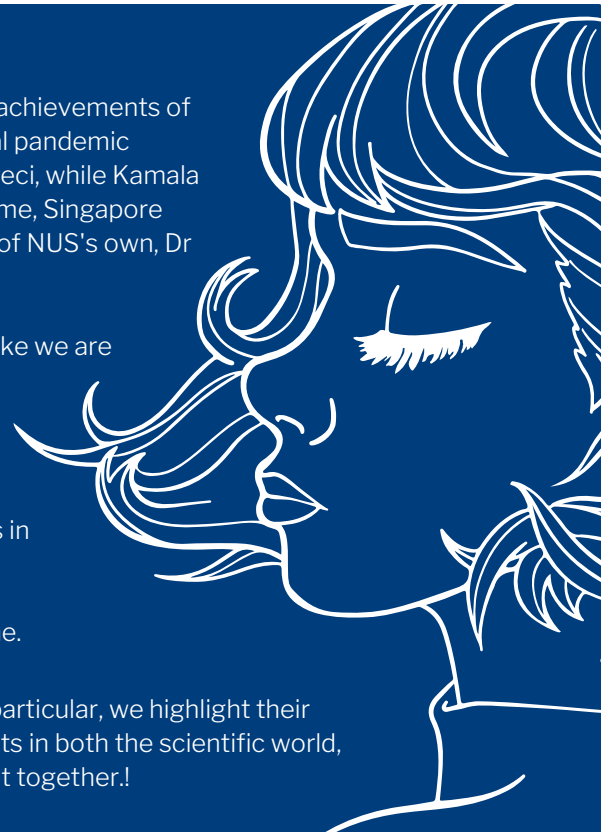
A Word From The Editor...

On 8 March every year, we celebrate International Women's Day, to recognize the achievements of all women around the world. And women have achieved a lot in the past year, global pandemic notwithstanding. The Pfizer-BioNTech vaccine was jointly developed by Ozlem Tureci, while Kamala Harris was elected the 1st female Vice President of the United States. Closer to home, Singapore elected in 27 women (29% of Parliament), a record in the nation's history. And one of NUS's own, Dr Leo Yee Sin, made it on BBC's list of 100 Women 2020.

Yet sometimes when we talk of outstanding women, especially in science, it feels like we are discussing some sort of unicorn.

To me, though, the future is hopeful. As societal perceptions of what constitutes 'women's work' changes, women will continue to make big strides in terms of participation in the sciences. Within Singapore, more women are taking up degrees in Science, Technology, Engineering and Mathematics (STEM) fields, especially in the biomedical and the natural sciences. With increased visibility of women in STEM, I believe we will see more female thought leaders emerge in our field, in time to come.

In this month's issue of the ImmunoLogs, we shine a light on women scientists. In particular, we highlight their research, learn more about their field of expertise, and celebrate their achievements in both the scientific world, and the wider NUS community. I hope you enjoy this issue as much as I did putting it together!



Programme News

Associate Professor Lina Lim has been appointed as Assistant Dean for Enterprise at the NUS Yong Loo Lin School of Medicine, with effect from 1 October 2020.

Lina is from the NUS Medicine Department of Physiology and is also Principal Investigator of the Inflammation & Cancer Laboratory in the LSI Immunology Programme. She is the Research Director of her Department and ITRP. She is also committee member of the NUHS Women in Science and Healthcare initiative (WISH).

In her new role as Assistant Dean (Enterprise), she will help lead the efforts in streamlining NUS Medicine Administration, developing policies and SOPs, as well as supporting the School in the adoption of the one NUHS culture.



Dr Benoit Malleret has been appointed Director of the Electron Microscopy Unit (EMU), Yong Loo Lin School of Medicine, NUS, on 15 February 2021. Benoit succeeds Professor Ong Wei Yi, who steps down after 8 years of service.

Benoit joined the Department of Microbiology and Immunology as an Assistant Professor in 2018. He is also a member of the NUSMed ITRP.

As Director, Benoit works closely with the Vice-Dean (Research) to ensure that the EMU continues to provide quality and professional EM services. He will oversee the development and forward planning of advanced EM expertise and techniques that support the research needs of the School of Medicine.



Congratulations to Lina and Benoit, and the ITRP wishes you both much success in your endeavours!

Events in March



Tuesday | 9 March 2021 | 10-11am

Dr Chintan Parekh

ITRP Seminar Series: Making a Movie of Human T-Cell Development from a Single Snapshot



Thursday | 11 March 2021 | 9am-12pm

NUHS Women in Science and Healthcare International Women's Day Conference 2021



Wednesday | 31 March 2021 | 4-4.45pm

Dr Anne Beghin

ITRP Research in Progress: March 2021

Getting to know... Dr Anne Beghin

In this month's ImmunoLogs, we feature Dr Anne Beghin. Dr Beghin is Facility Manager at the Singapore Microscopy and Bioimage Analysis (SiMBA), MBI, with a joint appointment as Research Assistant Professor at NUS Medicine. She is also the manager of the NUSMED ITRP's new Image Processing and Analysis Core. Read on to find out more!

Interviewer (I) : Anne, thanks so much for speaking with us! Let's dive right in: what sparked your interest in image analysis, and how did it develop into integrating AI ?

Anne Beghin (A): When I was a PhD student, I remember the first time I saw, on my own prepared samples, the condensed chromosomes well-aligned during a metaphase of mitosis- it was magic! Then I discovered that beyond just admiring the beauty of images and biology, you can extract numbers in a smart way. Here's where I jumped (or fell!) into the world of image analysis. Artificial Intelligence (AI) is a method of image analysis, but you can't base everything on AI. Some problems, especially image analysis of biological samples, are better solved using automated image analysis (i.e. dedicated algorithms) .

I: Could you tell me a little more about the types of image analysis that SiMBA does, and the deep learning suites developed by SiMBA?

A: In theory, we can analyze all types of images, but we specialize particularly in microscopy images from biological or chemical samples derived from fluorescence microscopy, as well as from lower-contrast images, such as brightfield, phase or electronic microscopy.

For our deep learning suites, together with our IT team, we have created 4 environments (*R*, *Keras*, *PyTorch* and *Matlab* algorithms) and made available detailed and user-friendly Jupyter notebooks dedicated to tasks such as denoising, image restoration, image segmentation, or object recognition. In terms of deep learning suites, we handle *U-Nets*, *Noise2Void*, *YOLOv2* and *v5*, and *CARE*.

I: Wow, it sounds like a lot of powerful tools... but how do we figure out which ones we should be using?

A: SiMBA welcomes any questions related to image analysis! We engage you, the user, in discussions on the imaging systems used to understand the nature of your query, and work with you to come up with solutions to achieve your goals. Very importantly, we talk the same language-we're biologists, too!

I: What are some challenges that you've faced in the past when it came to AI and image analysis, and how did you overcome them?

A: Each project poses its own unique set of challenges, but every problem that you solve helps to unravel the next one. We have an experienced team with a wide range of expertise, it is quite easy to solve problems of biologists. Also, some of the hardest images to analyze come from EM, but now thanks to AI, it's much easier.



I: What is an achievement that you are particularly proud of?

A: We are very proud of our pipeline which automatically detects mitosis and apoptosis in 3D stacks of images, and also of our brand new website and name 😊!

I: Finally, tell me a little bit more about yourself, and 1 thing you really enjoy doing outside of work!

A: Image analysis can be addictive, so I need to remind myself to maintain a balance between life and science. For that, I spend time on climbing walls to push myself, or practice drums for stress relief. I also love spending time with my family, because kids are really funny and amazing!

Many thanks to Dr Beghin for taking the time to chat with us! For more information on SiMBA, do check out their website at <http://simba-mbi.com/>. And if you'd like to know more about her research, join us for Research in Progress on 31 March 2021!

Programme Publications and Projects

Publications

HY Wong, and H Schwarz (Aug 2020) CD137 / CD137 ligand signalling regulates the immune balance: A potential target for novel immunotherapy of autoimmune diseases. *Journal of Autoimmunity*
DOI: 10.1016/j.jaut.2020.102499

Y Song, Y Zhu, B Hu, Y Liu, D Lin, Z Jin, Z Yin, C Dong, D Wu, and H Liu (Oct 2020) Donor $\gamma\delta$ T cells promote GVL effect and mitigate aGVHD in allogeneic hematopoietic stem cell transplantation. *Frontiers in Immunology*
DOI: 10.3389/fimmu.2020.558143

Y Gu, RWK Koh, ML Lai, D Pochinco, RZC Teo, M Chan, TM Murali, CW Liew, YH Wong, NRJ Gascoigne, KJ Wood, J Lescar, P Nickerson, PA MacAry, and A Vathsala (Oct 2020) Defining the structural basis for human leukocyte antigen reactivity in clinical transplantation. *Scientific Reports*
DOI: 10.1038/s41598-020-75355-4

ST Tan, T Ramesh, XR Toh, and LN Nguyen (Nov 2020) Emerging roles of lysophospholipids in health and disease. *Progress in Lipid Research*
DOI: 10.1016/j.plipres.2020.101068

B Demarco, JP Grayczyk, E Bjanec, D Le Roy, W Tonnus, C-A Assenmacher, E Radaelli, T Fettelet, V Mack, A Linkermann, T Roger, IE Brodsky, KW Chen, and P Broz (Nov 2020) Caspase-8-dependent gasdermin D cleavage promotes antimicrobial defense but confers susceptibility to TNF-induced lethality. *Science Advances*
DOI: 10.1126/sciadv.abc3465

M Prasad, J Brzostek, N Gautam, R Balyan, V Rybakina, and NRJ Gascoigne (Nov 2020) Themis regulates metabolic signaling and effector functions in CD4+ T cells by controlling NFAT nuclear translocation. *Cellular and Molecular Immunology*
DOI: 10.1038/s41423-020-00578-4

HY Wong, A Prasad, SU Gan, JJE Chua, and H Schwarz (Nov 2020) CD137-expressing B cells contribute to inflammation in Multiple Sclerosis. *Frontiers in Immunology*
DOI: 10.3389/fimmu.2020.571964

KP Yeo, HY Lim, CH Thiam, SH Azhar, C Tan, Y Tang, WQ See, XH Koh, MH Zhao, ML Phua, A Balachander, Y Tan, SY Lim, HS Chew, LG Ng, and V Angeli (Dec 2020) Efficient aortic lymphatic drainage is necessary for atherosclerosis regression induced by ezetimibe. *Science Advances*.
DOI: 10.1126/sciadv.abc2697.

TQ Nguyen, TM Vu, F Tukijan, S Muralidharan, JC Foo, JFL Chin, Z Hasan, F Torta, and LN Nguyen (Jan 2021) Erythrocytes efficiently utilize exogenous sphingosines for S1P synthesis and export via Mfsd2b. *Journal of Biological Chemistry*
DOI: 10.1074/jbc.RA120.012941

KY Lee, HY Wong, Q Zeng, JL Lin, MS Cheng, CH Kuick, KTE Chang, AHP Loh, and H Schwarz (Feb 2021) Ectopic CD137 expression by rhabdomyosarcoma provides selection advantages but allows immunotherapeutic targeting. *Oncoimmunology*
DOI: 10.1080/2162402X.2021.1877459

L Wu, J Brzostek, S Sankaran, Q Wei, J Yap, TYY Tan, J Lai, PA MacAry, and NRJ Gascoigne (Feb 2021) Targeting CAR to the Peptide-MHC Complex Reveals Distinct Signaling Compared to That of TCR in a Jurkat T Cell Model. *Cancers*
DOI: 10.3390/cancers13040867

PV Raghuvamsi, NK Tulsian, F Samsudin, X Qian, K Purushotorman, Y Gu, MM Kozma, WY Hwa, J Lescar, PJ Bond, PA MacAry, and GS Anand (Feb 2021) SARS-CoV-2 S protein:ACE2 interaction reveals novel allosteric targets. *eLife*
DOI: 10.7554/eLife.63646

New Projects

PI: Dr Paul Hutchinson

Project Title: To establish a predictive artificial intelligence (AI) based model using immune-phenotype correlation for disease stratification and prognosis in patients with ocular tuberculosis (OTB)

Grant Agency: NMRC

PI: A/P Veronique Angeli

Project Title: Contribution of arterial resident macrophage in abdominal aortic aneurysm development

Grant Agency: NMRC

PI: A/P Herbert Schwarz

Project Title: Significance of CD137 expression for B cell activation and autoimmunity

Grant Agency: MOE

Looking For A Job?

1) The Alonso Lab has 2 Research Assistant (RA) positions available! You will be working on virology and a COVID-19 vaccine project.

You should have

- a Bachelor's degree with honours;
- done their Final Year Project in a research lab working on related areas;
- experience working with animals is a plus.

Interested parties can send their CV to micas@nus.edu.sg.

2) MDPI is looking for Assistant Editors to join their newly opened Singapore office! You will provide support for the editorial process for academic research journals in your domain of expertise, organize peer review process for submitted manuscripts and coordinate editorial decisions, handle email communication between the parties involved in the publication process; collaborate with other members of the editorial team and production team; and ensure that scholarly articles are accurately edited and published according to tight deadlines, with a high degree of consistency.

You should have

- at least a Master's degree in either Life, Physical, Medical or Applied Sciences (Ph.D. is preferred);
- excellent written and spoken English skills;
- advanced knowledge of MS Office applications (Word, Excel, PowerPoint);
- be a team player with the capability to work in a dynamic, international environment;
- detail-oriented with the capacity to see the big picture;
- strong organizational and time management skills;
- very good communication and coordination skills;
- professional experience with scholarship publishing is an advantage;
- experience in creating presentations and writing is an asset.

Interested parties should send their cover letter and CV to hr-singapore@mdpi.com

In honour of International Women's Day, here's a little bit of science trivia might be useful if you ever find yourself on *Who Wants to be a Millionaire*:

It is common knowledge that Marie Curie was awarded a Nobel Prize in 1903, for Physics (with Pierre Curie and Henri Becquerel). In 1911, she won a second Nobel Prize on her own, this time in Chemistry. This made her not only the *first* woman to win a Nobel Prize, but the *first woman* to win in 2 fields, the *first person* to win 2 Nobel Prizes, and the *only person* to win in multiple sciences as well.

Her elder daughter, Irène Joliot-Curie, also won the Nobel Prize in Chemistry in 1935 (for her research in artificial radiation), making them the only parent-child pair to have won Nobel Prizes independently.

Her research took a terrible toll on her health, and she died of the effects of radiation in 1934. Due to the high levels of radioactivity, her remains are sealed in a lead lining, as are her research papers-anyone wanting to consult these papers must wear protective clothing. Even her cookbooks are radioactive!

**#truestory #canyouimaginewhatOSHEwouldsay
#incontrastmycookbooksareonlycoveredindust**

**And Now
For
Something
Completely
Different...**

