Dear NZMS members,

This edition of the NZMS Newsletter contains a reminder about renewing your membership, a reminder about the NZMS – ASM (Australian Society for Microbiology) Postgraduate Travel Award, and a report by Brett Wagner on her attendance at the 2017 American Society for Microbiology Annual conference, which was supported by the NZMS 2016 Student Oral Presentation prize.

Best wishes

Richard Cannon, NZMS President.

NZMS Membership

You should have recently received an email from me indicating your NZMS membership status. Thank you to those of you who renewed last year for two or three years and for those of you who have already renewed for 2018. If you renewed last year for one year and haven’t yet renewed for 2018, I would like to encourage you to do so in order to retain your membership benefits. For those of you in tertiary educational institutions you will soon have an influx of new eager microbiology students and so now is a good time to encourage these students, and your colleagues, to join the NZMS; a membership form can be found towards the end of this newsletter (please return completed forms to nicholas.heng@otago.ac.nz). It would be great if students join for the whole of their course, so remind them that there is a discount for multi-year membership.

NZMS - ASM Postgraduate Travel Award

This is a reminder that applications are invited from New Zealand Microbiological Society student members for the NZMS – ASM Postgraduate Research Travel Award. This award will support an NZMS student member to attend the annual conference of the Australian Society for Microbiology, Brisbane, 1-4 July 2018 and to visit the research lab of a collaborating researcher in Australia either before or after the conference. Please note that the NZMS Executive Committee have amended the entry conditions. There is no longer a requirement that applicants are New Zealand citizens or permanent residents, so international students are welcome to apply as long as they are student members of the NZMS and enrolled in a postgraduate program at a New Zealand tertiary educational institution. Details of the award and an application form can be found at the end of this newsletter, Applications close Friday 2 March 2018.
Recent advances in sequencing technologies, and the bioinformatics tools used to analyse sequence data, have offered unprecedented insights into microbial involvement in human health and disease. Chronic rhinosinusitis (CRS) is a debilitating disease, which affects approximately 5-16% of the global population, and presents a massive financial burden (estimated at $13 billion in the United States per year\(^1\)\(^,\)\(^2\)). CRS is a complex group of diseases resulting from interactions between host genetics, immune system, and microbiome. CRS is defined as inflammation of the sinonasal mucosa lasting longer than 12 weeks and is characterized by nasal congestion or discharge, facial pain or pressure, loss of sense of smell, polyposis, and mucopurulent discharge\(^3\). While microbial involvement in the pathogenesis of CRS has long been suspected, the exact role of microbes remains unclear. My PhD project focuses on the role of sinonasal microbial communities in the pathogenesis of CRS, as well as the composition and function of these communities during health.

The first project of my PhD was a meta-analysis, where we reanalysed all the available bacterial 16S rRNA gene sequence data. Our aim was to increase sample sizes and standardize the bioinformatics processes across the dataset in order to identify large-scale patterns in CRS bacterial communities when compared to healthy patients. Furthermore, we wanted to move beyond standard descriptive summaries and identify the mechanisms by which bacterial communities can be markers for sinus health. Our results identified two genera (Propionibacterium and Burkholderia) which are potential gatekeepers within the healthy sinonasal bacterial network. We provided evidence that CRS communities are dysbiotic, with increased community dispersion and fragmentation. Metagenome function prediction indicated that CRS communities are significantly enriched for genes related to antigen presentation and processing, as well as other functions involved in cellular processes and signalling. At the time of publication, this was the first study within the context of CRS to assess bacterial community network construction and fragmentation, and predicted metagenome function.

The results from this meta-analysis were presented at NZMS 2016 conference in Christchurch in the student oral presentations and were well received. The presentation was selected as the Student Prize winner and the very generous award was travel costs and registration to ASM 2017. I applied for a poster or oral presentation at ASM, and was awarded
a poster presentation at the conference. This was my first time attending the ASM conference, which typically attracts around 10,000+ participants.

New Orleans, Louisiana is an amazing place; it’s vibrant, filled with music, laughter, a diverse range of people from all over the world, and fantastic food. The ASM conference took place at the Ernest N. Morial Convention Center, which is right downtown and located on the Mississippi River. The city was incredible. The Blake Hotel, where I stayed during the conference, was located a short walk from the conference. I thoroughly enjoyed my walk to and from the conference and even though it rained many of the days, the weather was very warm and didn’t stop me from being outside.

The opening session included 3 speakers, Julie Theriot, Lalita Ramakrishnan, and Nick Lane. The speakers’ research interests were incredibly diverse, ranging from using physics to understand cell shape, studying tuberculosis and leprosy, and applying a bioenergetics basis for the three domains of life. However, I found the common thread throughout the talks, for me, was the idea of collaboration. All three of these research groups are able to tackle huge questions by working in teams, both cross disciplinary (such as Julie Theriot) and across
institutions. This year, ASM was composed of 7 tracks: Antimicrobial Agents and Infectious Diseases, Ecological and Evolutionary Science, Applied and Environmental Science, Host-Microbe Biology, Clinical and Public Health Microbiology, Molecular Biology and Physiology, and Profession of Microbiology. After reviewing the program, my main interests were split between the Host-Microbe Biology and Clinical and Public Health Microbiology.

I presented my poster during the first poster presentation session on Friday. My poster was based on the meta-analysis results that were presented during the talk at NZMS 2016. I had several people come up and discuss various aspects of the project. For example, several students stopped by who were analyzing some sequencing data for their own meta-analysis looking at horse gut bacterial community dynamics, and applying several of the same bioinformatic techniques. We discussed the parameters and settings that we used during our meta-analysis, as well as different ways to present results depending on the outcome of the network and fragmentation analyses. One medical practitioner stopped by and we discussed the inadequacies of current CRS treatments and therapies, and how frustrating it was to treat patients diagnosed with CRS. This sentiment is shared with many people in the medical field, as well as scientists researching CRS. We discussed the future of research on CRS, and how studies will need to include immunology data when interpreting the associated sinonasal microbiology, and that future microbial research in CRS will need to include viruses and fungi in compositional and functional analyses. We agreed that future CRS treatments will likely be patient-specific and the opportunity for pre- and probiotic developments was an exciting option.
All the speakers were very good; however, a talk by Eran Segal from the Weizmann Institute of Science in Israel, was the highlight for me. His research focuses on understanding the relationship between individual-specific changes in gut microbiome function and composition to clinical parameters in response to specific dietary interventions. In one of their studies, they measured post-meal glucose levels and microbiome changes in an 800-person cohort in order to understand the variability associated with digestion\(^4\). They then developed an algorithm that integrated clinical and microbial data to predict an individual’s post-meal glycemic response. Using this algorithm, they created tailored diets which assisted in controlling the patients’ post-meal glycemic response. This research highlighted how combining individual patient clinical and microbial data in large cohorts can be used to predict, create and manipulate patient outcomes.

Well-designed and thorough studies, like the one conducted by Segal and colleagues, are examples that CRS researchers can use to focus on teasing apart the high levels of interpatient variability by integration of clinical and microbial parameters. It also emphasizes the benefits of using large sample sizes and collecting a wide variety of patient data when designing accurate predictive models. Specifically, I was very interested in how they analysed complex data sets, and look forward to incorporating some of their analyses into CRS research.

ASM conference is a great opportunity to meet scientists studying the human microbiome, but because the conference attracts microbiologists from all fields it’s also a great chance to meet researchers studying something outside what I’m familiar with. I was invited to the ASM Ambassadors’ Reception which included scientists researching all aspects of microbiology from all over the world. I met a group of microbiologists from University of East Anglia in the U.K. that use molecular genetics to understand how microbes breakdown dimethylsulfoniopropionate (DMSP). Even though they research a completely different area within microbiology, we all employ sequencing-based technologies and analysis. The bioinformatics processes used to study DMSP production in microbes can be applied to investigate differential gene expression in my study system.

After ASM, a few of the people I met were staying in the city to explore for a few days. We decided to do a swamp-boat tour to search for alligators and a Mississippi river cruise.
Overall, attending ASM 2017 was a great opportunity to meet microbiologists studying medical microbiology, hear about the latest research, and learn to see my data from a different perspective. I found the speakers to be motivating and encouraging. International conferences provide a platform for microbiologists to establish connections with researchers from other institutions and potentially outside their perspective fields. As a PhD student that finishes at the end of the year, I highly value the connections I was able to establish during ASM. I very much recommend other students compete in the NZMS oral competition, as it builds public speaking confidence, makes research accessible, and can eventuate into an opportunity to travel to one of the biggest microbiology conferences.

Many thanks to the generosity of NZMS for the opportunity to travel to and attend ASM.

The research presented at NZMS and AMS has been published in Environmental Microbiology.(5)

References


3. Rosenfeld RM, Piccirillo JF, Chandrasekhar SS, Brook I, Kumar KA, Kramper M, et


Application for Membership

New Zealand Microbiological Society, Inc. (NZMS)

Full membership: $50.00/year  Retired/Student membership: $25.00/year

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Method of Payment  (GST No. 58-304-026)

(A) By Credit card:
- Card Type:
- Cardholder’s Name:
- Card Number:
- Expiry date (MM/YY):

(B) By cheque (Make out to “New Zealand Microbiological Society”). Please mail to:
Dr Nick Heng, Treasurer NZMS, University of Otago, P.O. Box 56, Dunedin 9054.

(C) By Internet Banking (PREFERRED) to:
ANZ Bank Account number: 01-0906-0185785-00

Note: Please quote your name in reference details

Students Only

In order to allow us to confirm your status as a student, please fill in the following details:

Supervisor / Head of Department:
Institution:
E-mail:

Privacy of Information

The NZMS does NOT reveal members’ details to third parties. We do, however, share information with other members that have similar interests for the purpose of organising NZMS-sanctioned special meetings, workshops, Special Interest Groups (SIGs), etc.

I do / do not (delete one) consent to my information being shared with other members.
The NZMS – ASM Postgraduate Travel Award

Applications are invited from New Zealand Microbiological Society student members for the NZMS – ASM Postgraduate Research Travel Award. This award allows for the reciprocal exchange of one student member to visit the annual conference of the other society and to visit the research lab of a collaborating researcher in that country.

In regards to the award for 2018, the successful applicant from New Zealand will be invited to submit an abstract to present their research at the annual meeting of the Australian Microbiological Society to be held in Brisbane (1-4 July 2018). They will also have arranged to visit the research laboratory of an Australian scientist in the period either immediately before or immediately after the annual meeting of the ASM. NZMS will pay for return economy airfares between New Zealand and Australia and any necessary internal connecting flights as well as a per diem living allowance for up to 14 days. The total value of the award will be up to a maximum limit of NZ$3,000. The ASM will waive the normal meeting registration fee for the successful applicant. Success of the award will also be conditional on ASM accepting the submitted abstract for some form of presentation.

The award will be made on merit and will be determined by a sub-committee of the NZMS. To be eligible, applicants must be student members of the NZMS and enrolled in a postgraduate program at a New Zealand tertiary educational institution. Applications should include a brief CV and synopsis of their research. This synopsis should also include details of the research and/or educational activities that will be conducted at the laboratory to be visited, the applicant’s stage of postgraduate study and estimated completion date. The successful applicant will also need to provide evidence of an active or emerging research collaboration between the student’s supervisor and that of the research group to be visited in Australia. Such evidence may include recent or current joint grants, joint publications or a statement from the PhD supervisor that joint research opportunities are emerging. In any event, the application must include an invitation from the Australian host institution agreeing to a visit at a suitable time. Applicants should download and apply via the official application form available from the NZMS web site (http://www.NZMS.org.nz/) and follow the instructions provided with this form.

Application deadline: Friday 2 March 2018

Applications should be emailed to the NZMS secretary: secretary@nzms.org.nz

Successful applicants will be expected to write a report on their research visit and attendance at the ASM conference, suitable for inclusion in the NZMS Newsletter.
NZMS – ASM POSTGRADUATE TRAVEL GRANT APPLICATION FORM

GENERAL INSTRUCTIONS

• All applications should be typed.
• All attachments should be on separate pages within one document file. Please include the applicant name at the top of each sheet of your application.
• Please limit the length of each attachment as requested in the instructions below.
• Please do not include any additional (not requested) materials in your application.
• No incomplete applications will be forwarded to the Selection Committee.
• No applications received after the application deadline date will be forwarded to the Selection Committee.

Applications should be emailed to the NZMS secretary: secretary@nzms.org.nz

Signed originals of all requested letters and documents should be available on request.
NZMS – ASM POSTGRADUATE TRAVEL GRANT APPLICATION FORM

APPLICATION COMPONENT CHECKLIST

Applicant
• Student Application Form: student information
• Australian host scientist Application Form: information on Australian host scientist
• Attachment 1. CV - Please submit your CV prepared in English. Please limit your CV to five pages.
• Attachment 2. Synopsis of Student Research - Describe any prior research experience(s) as a graduate or undergraduate student. List any publications or presentations as a result of your research. Describe the potential collaboration with your host. How will the visit to the host laboratory benefit you, your institution? How will you integrate any work done at the host laboratory into your research? Please limit your response to two pages.
• Attachment 3. Evidence of Collaboration - Provide evidence of active or emerging research between your PhD supervisor and the research group to be visited in Australia. Such evidence may include joint grants, joint publications, or a statement from your PhD supervisor that joint research opportunities are emerging.

Letters:
• Letter of invitation from the host scientist agreeing to your visit on specific dates.
APPLICATION FORM – STUDENT INFORMATION – PAGE 1 OF 1

All responses and written summaries must be typed and provided in English. Please limit your response to the space indicated in the instructions. Please include the attachment number and your name at the top of all pages.

Name: Last: _______________________ First: _______________________ Initial: _________

Department: ___________________________________________________________________

Postgraduate Supervisor: ___________________________________________________________________

Organization or institution: __________________________________________________________

Organization or institution Mailing Address: ____________________________________________

Daytime Phone: ________________________________________________________________

Fax: ____________________________________________________________________________

E-Mail Address: __________________________________________________________________

Postgraduate student: Yes/No

NZMS Member: Yes/No

I certify that the information provided for this application is correct to the best of my knowledge, and that I have not intentionally submitted any false information.

(Submission of false information is grounds for withdrawal of any awarded Grant)

Signature: _______________________________________________________________
NZMS – ASM POSTGRADUATE TRAVEL GRANT APPLICATION FORM

APPLICATION FORM – AUSTRALIA HOST SCIENTIST INFORMATION

Please provide typewritten responses for each question.

Name: Last: _______________________ First: _______________________ Initial: _____

Current position: _______________________________________________________

Department: ___________________________________________________________

Organization or institution: _____________________________________________

Mailing Address: _______________________________________________________

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Daytime Phone: ________________________________

Fax: ________________________________

E-Mail Address: ________________________________