

SEPTEMBER 2020

ANNOUNCING 19/20  
AWARD WINNERS

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INTERNATIONAL SOCIETY  
FOR LABORATORY  
HAEMATOLOGY 2020  
HIGHLIGHTS

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SAVE THE DATE - AIMS  
NSM 2021

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# BENCHPRESS

The official newsletter of The Australian Institute of Medical Scientists  
(Victoria Branch)  
A.C.N 010 985 403



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SAVE THE DATE - AIMS NSM 2021

## A NOTE FROM THE CHAIR

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What a year it has turned out to be consequent of COVID-19. Victorians have definitely been challenged with the second round of lockdowns. For some, lockdown fatigue has kicked in, but I urge Victorians to stay the course to slow the spread. During these tough times, I extend my well wishes to everyone and my gratitude to all the workers in health services, working hard to keep us safe.

My first year as Chair has been challenging but I feel extremely lucky to be supported by fantastic committee members namely Patricia, Jaelyne, Matt, Genia, Joe, Steve and Ian.

Unfortunately, this year we have to say goodbye to Jaelyne and Matt who are stepping down. Matt has been with the committee since 2011. He has been key to keeping our budget in the black and keeping the committee up to date on all things Immunohaematology.

Jaelyne has been with the committee since 2016. She has been instrumental in liaising with speakers and sponsors for many workshops and conferences the committee has held and in the last year, serving as Secretary. I'd like to say a huge thank you and wish Matt and Jaelyne well in their future endeavours.

The committee has been working hard to host the AIMS National Scientific Meeting which was supposed to be held in September this year. Due to unprecedented times, the event has been postponed to 2021. The theme for the event is "2021 Re-vision for the future". We are lining up some exciting speakers to present at the meeting and we look forward to your participation and attendance.

2019-20 saw four Victorians admitted as Fellows of AIMS. Congratulations to Narelle Whiting (Haematology), Nikki Lee (Transfusion), Jennifer Couper (Microbiology) and Claire Gregory (Microbiology). Super well done all!

Congratulations also goes to our 19/20 award winners including Geraldine Bollard, Kerry Weekes and Cindy O'Malley. You are all stars!



**Tina Pham**  
Chair  
AIMS VIC Branch



## GOT NEWS TO SHARE?

We would be delighted to share the good things you are doing in the scientific world.

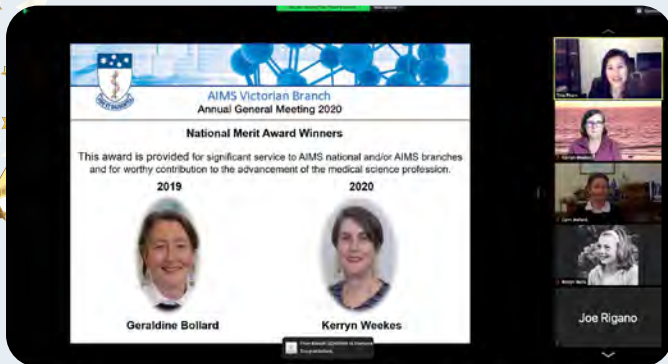
Contact us at [secretary.aims.vic@gmail.com](mailto:secretary.aims.vic@gmail.com) or via Facebook (@AIMSVictorianBranch) to let us know.

The submission deadline for next issue of Benchpress is the 31st December 2020.

# ANNOUNCING 19/20 AWARD WINNERS

By Patricia Szczurek

The opportunity to acknowledge the efforts of one's professional colleagues is perhaps the most enjoyable task that the Branch committee undertakes. So it was with great pleasure, during our virtual AGM on 18 August 2020, that we announced the following award winners for 19/20.

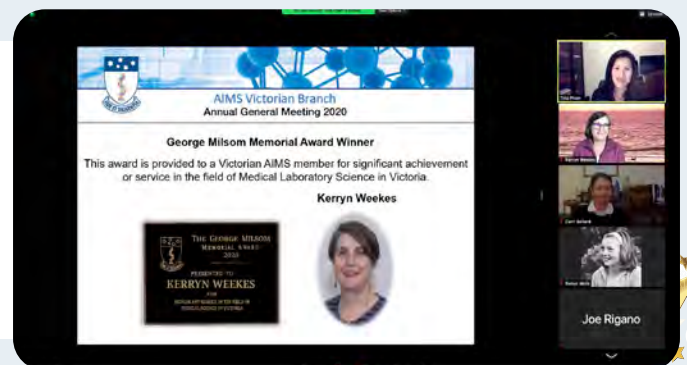


## AIMS NATIONAL MERIT AWARD

The committee was successful in the nomination of Geraldine Bollard in 2019 and Kerryn Weekes in 2020 for the national Merit Award. The award is given for significant service to AIMS national and/or AIMS branches and for worthy contribution to the advancement of the medical science profession. Congratulations to both!

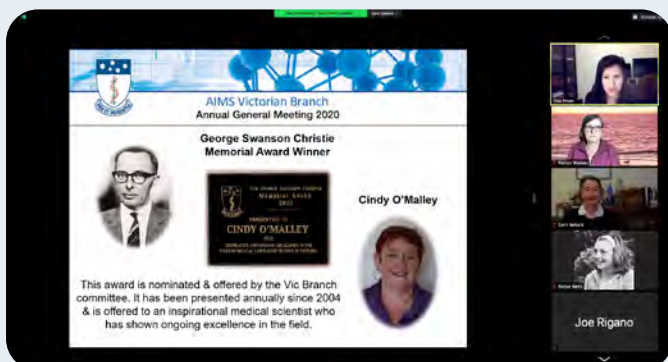
## GEORGE MILSOM MEMORIAL AWARD

This year's George Milsom Memorial Award recipient is Kerryn Weekes. This award is provided to a Victorian AIMS member for significant achievement or service in the field of Medical Laboratory Science in Victoria. Again, congratulations Kerryn! Thank you for your decade long service to the Victorian Branch.



## GEORGE SWANSON CHRISTIE AWARD

The George Swanson Christie Award goes to Cindy O'Malley. Cindy has demonstrated ongoing excellence in the field of medical laboratory science. Well done Cindy! Thank you for inspiring future generations of scientists.





**ISLH**  
INTERNATIONAL SOCIETY FOR  
LABORATORY HEMATOLOGY

**VIRTUAL  
MEETING**

**JUNE 22 - SEPTEMBER 25, 2020**

# INTERNATIONAL SOCIETY FOR LABORATORY HAEMATOLOGY 2020 HIGHLIGHTS

By Joe Rigano

The XXXIII International Symposium for the International Society for Laboratory Haematology (ISLH) was due to be held in Melbourne from 20th to 23rd of May 2020. Due to the global pandemic, the meeting is being held virtually from July 22 to September 25 2020. This report provides a brief summary of some of the latest discoveries and technological innovations in Laboratory Haematology.

## EPIGENETICS OF ACUTE MYELOID LEUKAEMIA

**Presented by Mark Dawson (Peter MacCallum Cancer Centre, Australia)**

Acute myeloid leukaemia (AML) is a heterogeneous disease characterized by transcriptional dysregulation that results in a block in differentiation and increased malignant self-renewal. AML presents a poor prognosis with less than a third of patients cured of this disease with current therapies. Chemotherapy can place 80% of patients into remission however this is not sustained in the majority of patients and relapse occurs within 2 years. It is often thought that chemotherapy, as a result of DNA damage, introduces new mutations that confers upon cells a survival and proliferative advantage leading them to become the dominant cell.

In AML, enhancer switching plays a major role in therapy resistance. Leukaemia stem cells (LSCs) undergo transcriptional adaptation by reprogramming via chromatin remodelling to meet therapeutic challenges by maintaining their plasticity similar to multipotent cells. As chemotherapy is applied to LSCs to turn off oncogenes, they reprogram using enhancers to overcome therapeutic challenges. This is believed to occur during MRD when patients are in complete remission. Current epigenetic therapies are effective at eradicating leukemic blasts cells however they are ineffective at altering the survival and proliferative adaptive potential of LSCs. The concept was proposed of using epigenetic therapy to counteract the adaptive process of LSCs occurring at the time of clinical remission.

Mark Dawson's research laboratory used RNAi and CRISPR to identify proteins and domains as novel epigenetic targets in AML. MYST acetyltransferase HBO1 was identified as a critical regulator of LSC maintenance and important for the survival and proliferation of blasts. The histone acetyltransferase domain of HBO1 is essential in the acetylation of histone H3 at K14. H3 acetylated at K14 facilitates the processivity of RNA polymerase II to maintain the high expression of key genes that help to sustain the functional properties of LSCs. HBO1 knockout studies demonstrated sufficient eradication of LSCs and leukaemia blasts. The loss of catalytic activity of HBO1 showed a marked reduction in H3K14 acetylation and resulted in a G0/G1 cell cycle arrest, induced apoptosis and differentiation of LSCs.

Taking advantage of LSCs dependency of HBO1, a highly potent and specific small-molecule inhibitor (WM-3835) of HBO1 was developed significantly reducing its catalytic activity. Treatment of cells with WM-3835 phenocopies the molecular and cellular effects of genetic depletion of HBO1 by inducing apoptosis, a G0/G1 cell cycle arrest and differentiation of human AML cells. This knowledge can be used to develop the next generation of small molecules that a more potent and efficacious and lead to the clinical translation of novel therapies for AML.

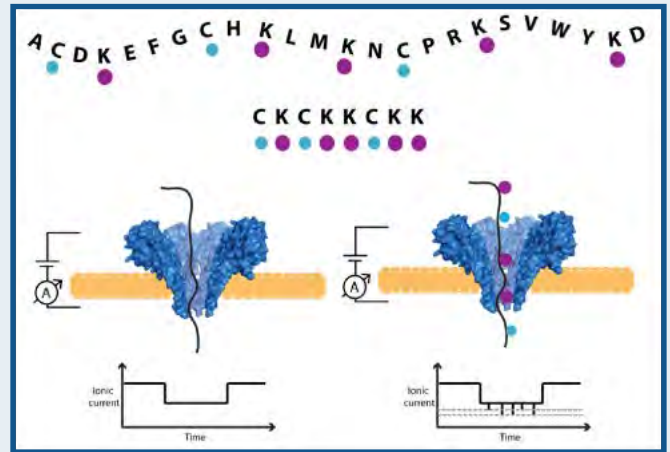
## SINGLE MOLECULE SENSORS - WALLACE H. COULTER DISTINGUISHED LECTURE

Cees Dekker (Delft University of Technology, The Netherlands)

In the 1950's, the Coulter principle was developed for counting and sizing particles in solution using impedance as they pass through an aperture altering the electrical resistance. Today, the Coulter principle has been used to count particles that are nanometers in size such as DNA and RNA using nanopores. Nanopores have the ability to sequence long lengths of DNA by measuring the impedance of each base without the need for amplification and labelling. Nanopores are created by a pore forming protein which is inserted into an electrical resistant lipid bilayer or a pore created in a synthetic material such as graphene or silicone.

Cees Dekker's research laboratory is working on the development of single molecule protein sequencing. The concept is that a protein in its linear form is traversed through a nanopore. Specific amino acids of the protein are labelled to allow protein fingerprinting. The labelled amino acid sequence can be used to identify the protein when compared to a sequencing database. Positively and negatively charged groups can be added to a protein of interest to facilitate unfolding and traversing through the nanopore allowing impedance measurement. This concept can be applied to the detection of posttranslational modifications of proteins such as phosphorylation and glycosylation. Nanopores also have the ability to detect protein size, shape, charge and functional conformations. Nanopores can also be used to trap and programme DNA to form

particular structures such as nuclear pore complexes, nano rotary motors and filaments in a process called 'DNA origami'. Nanopore technology companies have developed portable DNA sequencing products enabling direct, real-time electronic analysis of single molecules.



Nanopore single molecule protein sequencing using labelled amino acids.



Portable nanopore technology DNA sequencing devices.

## HEPARIN INDUCED THROMBOCYTOPENIA AND NETS - BEREND HOUWEN LECTURE

Beng Chong (University of New South Wales, Australia)

Beng Chong discovered the first case of heparin induced thrombocytopenia (HIT) in Australia in 1979 with only a few cases reported in the USA. At the time, the aetiology of HIT was unclear with no effective treatment or reliable laboratory test. Beng was involved in the identification of the aetiology of HIT, the development and refinement of laboratory assays for HIT and pioneered the use of danaparoid conducting randomised trials in the treatment of HIT. He characterised the plasma platelet agonist that caused platelet aggregation, release of serotonin and procoagulants and biosynthesis of thromboxane A<sub>2</sub>. Beng hypothesised that HIT was an immune condition. He purified IgG from the serum of six patients with HIT showed that they all induced platelet activation. Beng published his discovery and immune aetiology of HIT in 1982 and it gradually became widely accepted.

In HIT, heparin-PF4 immune complexes bind to FcγRIIIa receptors on platelets causing thrombocytopenia and platelet activation leading to thrombosis. The

same immune complexes bind to FcγRIIIa receptors on neutrophils and monocytes inducing cell activation and tissue factor (TF) expression. On endothelial cells the antibody binds to PF4 Heparan and PF4 chondroitin inducing endothelial cell activation and TF expression. TF expression results in activation of the extrinsic factor coagulation pathway leading to thrombosis.

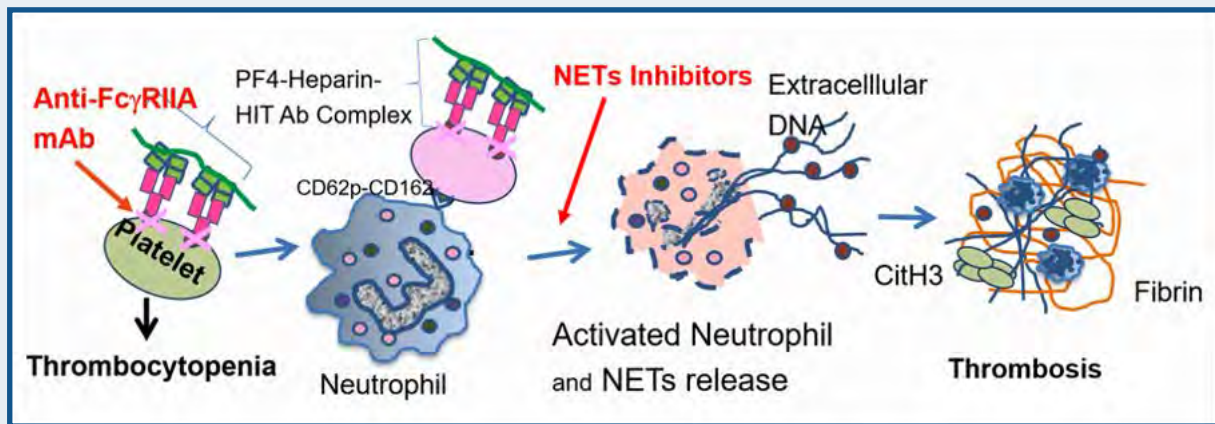
NETosis is a cellular process where activation of neutrophils release DNA net-like structures called neutrophil extracellular traps (NETs) trapping microorganisms to reduce the spread of infection. NETs also form the framework for thrombus formation attracting and activating coagulation factors. Beng's laboratory showed that heparin-PF4 immune complexes bind to FcγRIIIa receptors on neutrophils inducing activation and NETosis leading to thrombosis. This process also occurs in the absence of platelets. Thrombocytopenia was shown to occur in the absence of NETosis and thrombosis. The fact that thrombocytopenia and thrombosis are

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two distinct processes was a surprising discovery. Anti-FcγRIIIa mAb block heparin-PF4 immune complexes binding to platelets preventing thrombocytopenia and thrombosis. NETs inhibitors can prevent thrombosis

but not thrombocytopenia. Inhibition of NETosis could be a therapeutic target for the development of non-anticoagulant treatment of HIT. NETs markers may lead to new laboratory tests to improve the diagnosis of HIT.



Heparin-PF4 immune complexes bind to FcγRIIIa receptors on platelets and neutrophils causing thrombocytopenia and platelet activation leading to thrombosis. Anti-FcγRIIIa mAb prevents thrombocytopenia and NETs inhibitors prevent thrombosis.

## HEPARIN INDUCED THROMBOCYTOPENIA

Chee Wee Tan (Royal Adelaide Hospital, Australia)

Heparin induced thrombocytopenia (HIT) is a serious immunological complication of heparin exposure characterised by thrombocytopenia and potentially life-threatening arterial and venous thrombosis. HIT is triggered by the binding of heparin-PF4 immune complexes to platelet FcγRIIIa receptors causing macrophage clearance of platelets and platelet activation. HIT requires clinical assessment and laboratory testing for diagnosis. Clinical assessment is by pre-test probability using the 4T score. Laboratory testing is performed with a high sensitivity HIT antibody detection assay (ELISA) and a high specificity functional assay. To increase the specificity of HIT antibody detection, IgG (pathogenic) only immunoassays should be utilised that incorporate high dose heparin confirmation. Functional platelet activation assays detect pathogenic HIT antibodies utilising therapeutic and high dose heparin. The serotonin release assay (SRA) and heparin induced platelet aggregation (HIPA) are technically demanding requiring platelet washing and radioactive labelling and are limited to the responsiveness of platelet donors.

Rapid immunoassays (RIs) such as chemiluminescence immunoassays (CLIAs) have high sensitivity and specificity with reduced TAT compared to ELISAs.

Bayesian probability can increase the confidence in determining the likelihood of HIT using post-test probability. Post-test probability of HIT incorporates the 4T score and likelihood ratio of RIs (CLIA) based on the magnitude of the result, sensitivity and specificity. This combination reduces underdiagnosis of HIT (reduced risk of thrombosis), reduces overdiagnosis of HIT (reduces functional assays, unnecessary switching to non-heparin anticoagulants and reduces bleeding) and improved patient outcomes.

### POST-TEST PROBABILITY FOR CLIA TEST

| 4T SCORE      | Pre-test probability of HIT | POST-TEST PROBABILITY OF HIT (BASED ON 4T AND CLIA TEST RESULT) |                           |                                   |                                    |                                   |
|---------------|-----------------------------|---|---------------------------|-----------------------------------|------------------------------------|-----------------------------------|
|               |                             | CLIA neg (<1.0 U/mL)  | CLIA positive (≥1.0 U/mL) | CLIA positive-weak (1.0-4.9 U/mL) | CLIA positive-mod (5.0-19.99 U/mL) | CLIA positive-strong (≥20.0 U/mL) |
| Low           | 1.9%                        | <0.1%   | 56.1%                     | 18.9%                             | 73.6%                              | 100%                              |
| Inter-mediate | 6.7%                        | 0.2%  | 82.6%                     | 46.3%                             | 91.1%                              | 100%                              |
| High          | 36.6%                       | 1.8%  | 98.4%                     | 87.4%                             | 98.3%                              | 100%                              |

Post-test probability of HIT utilising the 4T score and CLIA.

# STUDENTS' PERSPECTIVES ON PROFESSIONAL PLACEMENT & ONLINE LEARNING

By Tina Pham

Professional placements are valuable experiences where medical science students can develop their professional knowledge and skills in industry to fully prepare them to work anywhere in Australia in diagnostic pathology or medical research. In March we found ourselves in extraordinary times, this has meant that many universities had to close and pivot to online learning. Hear what some of the students had to say.

**KAY KORALEGEDARA**  
MASTER OF LABORATORY MEDICINE - RMIT



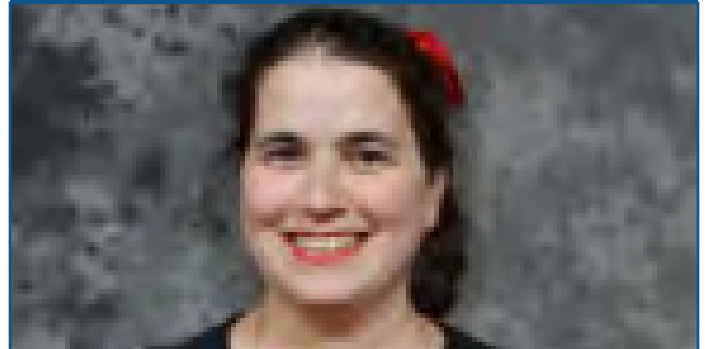
“As an international student, I started my postgraduate studies in 2018 with lots of expectations and energy. I was very excited and at the same time very nervous about my placement because I have never had an experience like this.

In March I started my professional practice at Monash Pathology: Dandenong Hospital. The core laboratory experience was a great opportunity because it is a place where we can put to practice the things we learned in the classroom.

I was very lucky to train under well-renowned scientists in Haematology, Biochemistry and blood bank areas. I was required to do the daily maintenance of the analysers such as DxH800 and AU680. Also, I loaded samples into the analysers, perform the daily quality controls, troubleshooting whenever required, and general operation of the analysers.

While learning the laboratory techniques, I also tried to learn and understand the health and safety practices, workplace ethics, the importance of teamwork, communication skills, and quality management. I've learnt many valuable things working in the laboratory environment and it is the most wonderful academic achievement I've had in my life. I'm really grateful and appreciative of RMIT University for giving me this opportunity.”

**RAQUELLA NEIGER**  
MASTER OF SCIENCE - SWINBURNE UNIVERSITY



“As soon as 2020 arrived, I was so excited as this was going to be the year I finished my Master of Science in Biotechnology at Swinburne University. Unfortunately, my excitement was short-lived as the restrictions came into place and all the classes, labs, events and social clubs went online.

Just last semester I was completing a major research project which had many laboratory requirements including creating your own agar plates, isolating microbes from dental prostheses, streaking different agar plates and ended in microbial identification via Sanger Sequencing in order to determine health implications. Today, this would be an impossible feat to accomplish, as laboratories are closed.

Luckily at this point, I had finished all the laboratory components for the master's degree and therefore my online learning consisted of a one-week tutorial in which we discussed the issues or concepts, supplemented with useful, online discussion boards. However, there is no substitute for the real-life classroom teacher which presented its own learning issues.

Finally, I see this period of study as a challenging one but not unsurmountable. I achieved an enormous amount of study and excellent skills such as critical thinking. This experience taught me to take time to laugh, be more compassionate and empathetic to others, and resilient.”



# VICTORIAN FACES OF THE FELLOWSHIP

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By Claire Gregory

I had originally contemplated enrolling in the AIMS Fellowship program back in 2011 after my return from working in the UK, as I sought a way to progress my career in Microbiology. However, my second child soon arrived and those plans were shelved for a little while.

In 2017 I bit the bullet and enrolled into the Microbiology discipline of the Fellowship program and sat my first exam in June of that year. The months leading up to that first exam were terrifying! I worked so hard preparing for the exam and I put a tremendous amount of pressure on myself to pass, as the Medical Microbiology module I considered my specialty. I soon received the news that I passed.

The next three modules over the following 18 months became more enjoyable as I gained a better understanding of what was expected of me. I sat my final written exam in November of 2018. However, there was still another whole year of study ahead of me as I prepared for the Viva Voce exam and my dissertation.

In June of 2019 I sat opposite my peers as I undertook my Viva Voce exam, and I was incredibly nervous. At the end of a very long couple of hours I was told that I had passed. The topic of my dissertation examined the utility of EBV viral loads as a predictor of post-transplant proliferative disorder. It was completely out of my comfort zone as I have previously considered myself a bacteriologist, not a virologist. However, I enjoyed the challenge that completing the Fellowship modules allowed me to embark on. I submitted my dissertation in March 2020, and received my Fellowship award not long after.

The AIMS Fellowship program has been a rewarding means of developing my career as a Medical Scientist. Was it easy? No! It required a lot of commitment and preparation. But the course structure meant it was manageable in my own time, and with 2 young kids to look after this made the program achievable. It has strengthened and broadened by knowledge, and given me the confidence to investigate organisms and problem-solve in areas that I had previously considered too challenging. Importantly, it has made me a better teacher and mentor to other staff in Microbiology.



# Australian Institute of Medical Scientist (AIMS) FELLOWSHIP

The AIMS Fellowship is an attractive and highly competitive option to academic post graduate degrees. It is recognised by the Commonwealth of Australia for meeting the requirements for supervision of category GX and GY laboratories.

|  |
|--|
| <b>TRANSFUSION SCIENCE</b>                 |
| <b>CLINICAL BIOCHEMISTRY</b>               |
| <b>CYTOLOGY</b>                            |
| <b>HAEMATOLOGY</b>                         |
| <b>ANATOMICAL PATHOLOGY</b>                |
| <b>IMMUNOLOGY</b>                          |
| <b>MICROBIOLOGY</b>                        |
| <b>GENERAL (INCLUDING CORE LABORATORY)</b> |

Qualification for the Fellowship is by EXAMINATION in one of the eight disciplines.

Candidates for the Fellowship must have been members for a minimum of two years and must meet certain other criteria.

The Fellowship program is modular - candidates must complete:

- Two compulsory modules
- Two elective modules
- A viva voce examination
- A scientific dissertation OR a successful relevant research degree thesis completed within the last two years (eg Honours, Masters, PhD); OR a relevant paper published in a peer reviewed journal.

To enrol in the Fellowship program or for further information please contact the AIMS National Programs Manager:

Ph: +61 7 3876 2988

E mail: [programs@aims.org.au](mailto:programs@aims.org.au)

# GET YOURSELF CERTIFIED!



The Australian Council for Certification of the Medical Laboratory Scientific Workforce (ACCMLSW) is a newly created not for profit company established to administer the voluntary certification scheme for medical scientists and technical officers.

## WHY BECOME CERTIFIED?

Your status as a certified medical laboratory professional is a public guarantee that you are qualified, competent and continuing your professional development.

- Recognition of scientific qualifications
- Certification aligned with competency development and assessment processes
- Acknowledgement of participation in continuing educational activities
- Increased professional credibility and prestige in the industry
- Support of industry standards
- Demonstrated commitment to superior professionalism
- Advantage in the recruitment process

The certification scheme is now open. Applications received before 31 December 2020 will receive a 10% discount on the normal application fee.

Visit the website <http://www.accmlsw.org.au/apply> to apply. If you encounter any problems or have any questions, please email: [office@accmlsw.org.au](mailto:office@accmlsw.org.au).



Australasian Professional Acknowledgement Continuing Education (APACE) is a voluntary programme that recognises professional activities which contribute to professional growth.

## WHY BECOME CERTIFIED?

- Participation in CPD activities demonstrates a commitment to ongoing continuing education and professional development.
- APACE provides formal recognition of activities that may have been pursued on personal basis without recognition – records for a professional development portfolio.
- An APACE Certificate enhances professional profile and is a bonus on a resume.
- Recognition of participation in activities provides encouragement to maintain, improve and extend knowledge and skills for scientific and professional duties.
- CPD is about extending your knowledge and keeping up with, or ahead of, current developments and practices.
- CPD participation ensures a competent workforce and enhanced quality of service for increased confidence of service users.

The programme is open to members of AIMS, AACB, ASM, THANZ, ANZSBT and FSA. APACE participants can lodge applications and activities using the online diary [www.apace.org.au](http://www.apace.org.au).



# 2021

## RE-VISION

FOR THE FUTURE



Australian Institute  
of Medical Scientists

### AIMS NSM 2021

30 AUG – 1 SEPT  
MELBOURNE

[HTTPS://AOMEVENTS.EVENTSAIR.COM/AIMS-NATIONAL-SCIENTIFIC-MEETING-2021/](https://aomevents.eventsair.com/aims-national-scientific-meeting-2021/)

**SAVE  
THE  
DATE**

## YOUR VICTORIAN BRANCH COMMITTEE

### CALL FOR COMMITTEE NOMINATIONS

Being a committee member is an excellent activity for personal development and provides opportunities to broaden professional and personal skill sets and create connections with others in the industry.

We are currently seeking the following for the 20/21 term:

- Secretary
- Treasurer
- Committee Member
- Student Member

Email us at [secretary.aims.vic@gmail.com](mailto:secretary.aims.vic@gmail.com) to express your interest and we will get in touch with you soon for a chat. We look forward to hearing from you!



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