

VCE Biology Teachers' Conference 2019

Tuesday 12 February 2019 at La Trobe University, Bundoora

The VCE Biology Teachers' Conference is an approved professional learning activity.

Conference Program

7.30am	Registrations Open/Exhibition Viewing	Union Hall and Annexe
9.00am – 9.15am	Welcome by STAV President	Agora Theatre
9.15am – 10.00am	Keynote Address – Mark Hulett and Marc Kvensakul	Agora Theatre
10.00am – 10.30am	VCAA STEM Science Manager – Erin Wilson	Agora Theatre
10.30am – 11.00am	Morning Tea	Union Hall
11.00am – 11.45am	Session A	
11.55am – 12.40pm	Session B	
12.40pm – 1.40pm	Lunch	Union Hall
1.45pm – 2.30pm	Session C	
2.30pm – 3.30pm	Meet n' Greet	Eagle Cafe

Wifi and laptops at the Conference

Wifi is available to participants, a username and password will be provided on the day.

Electrical Appliance Compliance

Please ensure that any electrical device you bring has a compliance tag on the power lead otherwise you may be prevented from using it.

Disclaimer

STAV does not accept any responsibility for any damages caused by any individual on the day.

Registration information, La Trobe University Map and all conference information is available on the **Science Victoria website: www.sciencevictoria.com.au/conferences.html**



Proud Sponsor of the Coffee Cart, come and enjoy a free fresh hot beverage.



**Science Teachers' Association of Victoria Inc.
VCE Conference Series 2019**

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VCE Biology Teachers' Conference 2019

Welcome
9:00am – 9:15am

Keynote Address 9:15am – 10:00am

Unlocking the antimicrobial action of innate defence peptides: A story of multidisciplinary research collaboration

Mark Hulett and Marc Kvensakul

Infectious diseases are a major global health problem accounting for over 1 in 8 deaths and without the development of new antimicrobial therapies, mortality rates are predicted to rise 10-fold over the next 30 years. The most significant and challenging problem is the rise of resistance to anti-infective drugs that will eventually lead to the exhaustion of effective long-term drug options. Pathogenic fungi are a major health problem in this context and collectively kill over 1.5 million people per year. *Candida albicans* is a common but significant fungal pathogen in humans that is responsible for life-threatening infections in compromised patients such and those that are immunocompromised or suffering from cancer. There is clearly an urgent need to develop new treatments for *Candida* infections. Natural antimicrobial molecules that are found in all species known as defensins are showing significant clinical promise as new antimicrobial therapeutics. By joining forces, the research laboratories of Dr Mark Hulett and Dr Marc Kvensakul have used a multidisciplinary scientific approach to discover that specialist types of plant and human defensins are potent killers of *Candida albicans*. Using molecular-cell biological approaches together with the power of the Australian Synchrotron, they have shown in atomic detail how defensins target and destroy *Candida* through a novel lytic process that causes the fungus to explode. This exciting discovery could be harnessed to develop a new life-saving antimicrobial therapy against *Candida* and potentially other pathogenic microbes.

Dr Mark Hulett



Dr Hulett completed his doctoral studies at The University of Melbourne on immune cell receptors in inflammation and allergy. He was awarded

an NHMRC Peter Doherty Postdoctoral Fellowship (1995-1998) to continue his work on immune receptors at the Austin Research Institute. Dr Hulett moved to the John Curtin School of Medical Research (JCSMR) at The Australian National University in 1999 where he cloned the enzyme heparanase and described its important role in inflammatory disease and cancer. Following the awarding of a Viertel Senior Medical Research Fellowship in 2002, Dr Hulett established an independent laboratory at the JCSMR to study molecular aspects of immune and tumour cell migration. In 2008 Dr Hulett moved his research group to the Department of Biochemistry at La Trobe University. His current research interests include inflammation and the tumour microenvironment, as well as the mechanism of action and therapeutic application of innate defense molecules. Dr Hulett has a passion for teaching having been the course coordinator for the Bachelor of Biomedical Science at La Trobe University (2011-2017) and the primary supervisor for over 15 postgraduate PhD students. He has published >100 peer-reviewed papers and his research has been recognized with a number of awards including the Howard Florey Medal and Tall Poppy Science Award. Dr Hulett is also a strong advocate for science and medical research having been a past-president of the Australian Society of Medical Research. He is currently the Deputy Director of the La Trobe Institute for Molecular Science at La Trobe University.

Dr Marc Kvensakul



After completing an undergraduate degree in Biochemistry at Imperial College London, Marc was awarded a Wellcome

Trust Prize Studentship to pursue a PhD with Prof. Erhard Hohenester at Imperial College London, investigating collagen-binding proteins in the extracellular matrix. In 2004 he took up a Leukemia & Lymphoma Society of America fellowship to work with Prof. Peter Colman at the Walter and Eliza Hall Institute, where he developed a passion for host-pathogen interactions. His post-doctoral work centered on the molecular basis of virus mediated subversion of host cell death. In 2010, Marc was awarded an NHMRC Career Development Award to establish the inaugural structural biology laboratory at La Trobe University. Now an ARC Future Fellow, his work has expanded into the role of innate immunity molecules in anti-microbial defence. In addition to a passion for research he is also committed to communicating science to the public, and his efforts in both areas have been recognized by the Victorian Tall Poppy in Science award and the Sandy Mathison Medal from the Society of Crystallographers from Australia and New Zealand.

VCAA STEM Science Manager
10:00am – 10:30am

Erin Wilson,
Biology VCAA STEM Manager

Morning Tea/Displays
10:30am to 11:00am

Session A

11:00am – 11:45am

A1 Why are we learning this? Real-life Case Studies from the Zoo

TBA, Zoos Victoria

Zoos Victoria is here to help you answer your students when they ask you, "Why are we learning this?". You will learn how to show students that the content taught in VCE Biology is being used, right now, as part of Zoos Victoria's conservation programs. You will explore case study investigations on local animal species, that satisfy outcomes in the VCE study design. You will hear stories and insights from the Zoos team about what science looks like out in the field. Plus there will be time to chat to other teachers about what they do in their curriculum.

Suitability: VCE Units 1, 2 & 4

Not Repeated

A2 Contemporary Science Practice in Schools

Peta White & Maria Vamvakas, Deakin University - School of Education

Contemporary research science is often fascinating and can provide an interesting and often local context for your students. The use of current research science can also provide useful ways of engaging with science as a human endeavour and science inquiry skills in a real life context. For the last five years Deakin University researchers Dr. Peta White, Maria Vamvakas and colleagues have been finding ways to get research scientists to work with to teachers and pre-service teachers to develop teaching and learning materials for lower secondary science (across the disciplines) and VCE Biology. Come along and find out about these free, classroom ready online resources.

Suitability: All

Repeated in B2

A3 Teaching Biology using Problem Based Learning

Caroline Cotton, Cotton Educational Consulting

Problem-based learning (PBL) develops higher order thinking skills. Higher order thinking skills are seldom taught, but should be included as part of any curriculum.

PBL learning teaches students to develop thinking skills such as the ability to hypothesise, synthesise, analyse, evaluate, and generalise information rather than simply recall it. By solving problems students also have the opportunity to

develop critical thinking skills. Come along to this session to learn how to incorporate PBL into your Biology classroom.

Suitability: All

Repeated in B3

A4 Mobile phones apps that turn primary and secondary students into scientists

Michael Kasumovic, UNSW Sydney/ Arludo

Much of what students learn in science is invisible, which means scientific concepts are often difficult to explain. We've simplified science teaching by creating a library of mobile applications that engage students and encourage them to interact. As they interact, the applications collect data about the topic students are learning about and visualize these data anonymously at the front of class. After playing for 10-15 minutes, students and teachers can then spend time discussing the data together. This allows teachers to focus on teaching scientific inquiry, hypothesis testing, and experimental design. Our applications are also perfect for depth studies.

Delegate Note: Please bring your mobile phone and be ready to play just like your students would!

Suitability: All

Repeated in B4 & C4

A5 VCE Unit 1 - Ecology, Hands on simulations

Michael O'Brien, Newbyte Educational Software

Modern technology in your classroom creates fantastic opportunities to expand the understanding of your students in an engaging and fun way.

This, hands on workshop, will give you some great practical ideas for covering relationships between organisms within an ecosystem as well as methodologies and techniques of primary qualitative and quantitative data collection. During the workshop we will examine several software packages including Food Webs - Australian Woodlands, Ponds and Rocky Shore Ecology.

You and your students will receive a FREE access to our online content for 6 weeks!

Look for our other workshops at this conference.

DelegateNote: Please bring your own laptop fully charged. A laptop or iPad is not essential, however it will help you participate more full in the activities.

Suitability: VCE Unit 1

Not Repeated

A6 Blank

A7 Using Wolfram tools to advance exploration in Biology

Craig Bauling, Wolfram

The Victoria Department of Education is supplying to all public and private schools the complete Wolfram tools suite including Mathematica - for higher secondary explorations,

Mathematica Online - for iPads and Tablets, Wolfram|Alpha Pro - for cross discipline exploration,

Wolfram Programming Lab - for introductory coding and Algorithm explorations, and

Wolfram SystemModeler - for visual modelling and simulation.

Join Craig Bauling as he presents an overview of these tools and details on how to gain access for you and your students. Specific examples will highlight tool use in the field of Biology.

Suitability: Years 7 - 10; VCE Units 1-4

Repeated in C2

A8 Bytesize Bioinformatics - understanding gene regulation using transcriptomics

Dr Anjali Sahasrabudhe, Dr Rohan Lowe & Dr Harinda Rajapaksha, Outreach Program, La Trobe Institute of Molecular Science

Give your students a taste of bioinformatics using real experimental data. Preview this brand-new workshop in which students use a web-based point-and-click software to analyse transcriptomics data from actual experiments conducted with the model plant Arabidopsis.

A guided sequence of activities simplifies a complex dataset and identifies patterns in gene regulation that occur as plants respond to light. Aligning with Unit 3 AOS 1, this workshop reveals how bioinformatics captures the dynamic nature of photosynthetic processes, providing an overview of the interplay between environmental factors and gene expression.

This workshop, developed in collaboration with researchers and bioinformaticians, shows how to make biological sense of complex bioinformatics data through a user-friendly analysis pipeline.

Delegates Note: Participants to bring their own laptops fully charged.

Suitability: VCE Unit 3

Repeated in B8

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A9 Multiple Applications Of Gel Electrophoresis

Dr Radhika Iyer, Mullauna College

Gel electrophoresis can be explained as a basic laboratory tool used to separate mixtures of DNA, RNA, or proteins according to molecular size. In gel electrophoresis, the molecules to be separated are pushed by an electrical field through a gel that contains small pores. These pores could be varied according to the purpose of the experiment.

This workshop will give hands on experience to load and run the gel. Various steps involved prior to running the gel will be discussed.

This session will benefit those participants who are planning to initiate Gel Electrophoresis experiment for the first time at the VCE level. Beneficial for others, keen to understand how this technique can be put to extended use to explain various concepts in inheritance, Forensic sciences, Evolution and biochemical bioassays.

Let's explore together how we can use this technique to gain a better understanding of the concepts in inheritance, (directly relevant to Unit 2 & 4, VCE study design Biology) and how we can extend it to other areas of learning.

Repeated in C9

A10 Effective Formative Assessment with Education Perfect

Michael Villanti, Education Perfect

A key recommendation from Gonski 2.0 is the move from summative assessments measured against year level outcomes to more regular formative assessments that acknowledge learning progressions. Of particular importance is the role that formative assessments can have to help students become active partners in their learning journey. One component that makes formative assessment so powerful is the feedback that is provided to students. Feedback is most effective when it is timely and specific. It can be incredibly difficult for a teacher to mark and review every student's responses, efficiencies can be gained through an automatic marking and analysis tool to accelerate the feedback provided to students. This

in turn frees up teacher time to further target specific areas to follow up with students. Education Perfect is a resource that has a range of content aligned to the Australian and Victorian Curriculum. It has an assessment tool that can automatically mark and analyse class and student results. Plus overall, it provides the resources to implement effective regular formative assessments in your classroom to empower you as a teacher and encourage a growth mindset in your students. This session will explain how to do this using Education Perfect.

Suitability: All

Repeated in B10 & C10

A11 Human Evolution: Trends, anomalies and new discoveries

Richard Allan, Biozone Learning Media Australia

How do the most recent discoveries and scientific data gathering techniques affect how you teach this exciting but challenging topic? This presentation will explore recent advances in scientific thinking and modelling of human adaptive radiation. See how BIOZONE has developed annotated 3D models that allow students to explore early human anatomy on their own devices. Explore curated content on Pinterest and the potential of 3D printing models of early human skulls for the classroom. Workshop attendees will each receive a free copy of BIOZONE's VCE Biology for Units 3&4 student edition, plus a copy of the PowerPoint presentation.

Suitability: VCE Unit 4

Not Repeated

A12 Modelling to understand

Elise Meehan, Saint Ignatius College Geelong

This session will focus on how to incorporate modelling activities into VCE Biology to increase engagement and to allow students to develop a more comprehensive understanding of the scientific concepts being investigated. Modelling activities will be presented on cell division, protein synthesis, the lac operon and rational drug design.

Suitability: VCE Units 1, 2, 3 & 4

Not Repeated

A13 Modelling Contagious Disease

Clinton Hale - Maribyrnong College

Kahlia Norwood - Blackburn High School

Rupa Oberoi - St Joseph's College Mildura

Ritu Tyagi - Roxburgh College

Annette Williams - Biology Teachers Network

This simulation allows students to investigate the rate of spread of infectious diseases under different conditions (including: number of initial carriers, population size, infection rate, vaccination rate). These conditions may be changed as required. The simulation uses real data from medical and government websites. The resource is specifically designed for VCE Biology Unit 3 students, however, may be adapted for students at lower levels. The resource consists of a disease modelling simulation in three parts which may be used together or separately.

Part 1 - Modelling the effectiveness of vaccination and herd immunity

Part 2 - Vaccination and society

Part 3 - The Science of vaccines

The program contains: the simulation; other modules to produce graphs within the simulation; information and data pertinent to the investigation; links to appropriate websites and videos; structured questions to answer and expanding spaces to write answers.

Repeated in B12

Session B

11:55am – 12:40pm

B1 Online Learning through VCE Biology Unit 3 Revision

Soula Bennett and Carlie Alexander, Quantum Victoria

In this session, teachers will have the opportunity to interact with the two VCE Biology courses on the Quantum Victoria Portal. These courses are available for FREE and participants will be able to access the ability to observe student growth and provide the necessary scaffolding that deepens their students' knowledge as they prepare for the VCAA exams. Teachers will be shown how to access the individual and class data produced once a student has completed a course.

The courses are Unit 3, Area of Study 1 'How do cellular processes work' and Unit 3, Area of Study 2 'How do cells communicate?'

Delegates Note: Delegates are to bring own laptop or tablet fully charged

Suitability: VCE Units 3

Not Repeated

B2 Contemporary Science Practice in Schools

Peta White & Maria Vamvakas, Deakin University - School of Education

Contemporary research science is often fascinating and can provide an interesting and often local context for your students. The use of current research science can also provide useful ways of engaging with science as a human endeavour and science inquiry skills in a real life context. For the last five years Deakin University researchers Dr. Peta White, Maria Vamvakas and colleagues have been finding ways to get research scientists to work with to teachers and pre-service teachers to develop teaching and learning materials for lower secondary science (across the disciplines) and VCE Biology. Come along and find out about these free, classroom ready online resources.

Suitability: All

Repeat of A2

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Suitability: All

Repeat of A3

B4 Mobile phones apps that turn primary and secondary students into scientists

Michael Kasumovic, UNSW Sydney/ Arludo

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Delegate Note: Please bring your mobile phone and be ready to play just like your students would!

Suitability: All

Repeat of A4 & Repeated in C4

B5 VCE Unit 2 - Genetics First-Hand data the easy way

Michael O'Brien, Newbyte Educational Software

Using the new Drosophila and Pea Plant Genetics Labs as an effective tool for VCE. This, hands on workshop, will give you some great practical ideas for using this new technology in your classroom. First-hand data collection will hammer home the understanding required at VCE level. All with auto-marking Labs, which will save your hours of marking.

You and your students will receive a FREE access to our online content for 6 weeks!

DelegateNote: Please bring your own laptop fully charged. A laptop or iPad is not essential, however it will help you participate more full in the activities.

Suitability: VCE Unit 2

Not Repeated

B6 Jobs of the Future: Teaching Big Data

Anna-Leisa Vietz, Get into Genes & Agriculture Victoria

How can we introduce students to bioinformatics, big data, and its collection?

Utilising the expertise and capability of AgriBio, Centre for AgriBioscience, eucalypt DNA was sequenced to be used in "Get into Gums", one of the curriculum linked "Get into Genes" workshops.

In this session participants will step through the application of freely available bioinformatics software applied by students to align molecular sequences and manipulate data. While highlighting interesting findings that students discover for themselves in relation to the impact DNA sequencing technology has had on conventional classification techniques, participants will also gain insight into how the eucalypt molecular data set was collected and the constant advancements in DNA sequencing technologies.

Delegate Note: A brief tour of the DNA sequencing facilities at AgriBio will be conducted at the end of this session.

Suitability: VCE Unit 1

Repeated in C8

B7 Animal Behaviour: the functional application of learning models to modify and shape behaviour

Dr Brad Rundle, Therapy Animals Australia

Dr. Brad Rundle is the Director and Head Trainer at Therapy Animals Australia, a charitable organisation that trains assistance/service dogs and therapy animals to support individuals suffering from mental and/or physical disabilities and illnesses.

This presentation will enable participants to get a first-hand look at some of the principles of animal behaviour and behavioural modification, including various learning models. What better way is there to further yours and your students knowledge and understanding of shaping behaviour as well as classical and operant conditioning (and this is just scratching the surface) than to discuss these topics with expert animal trainers not to mention meeting and observing one of our

VCE Biology Teachers' Conference 2019

amazing animals in action!!

Therapy Animals Australia raises funds to support its charitable purpose by offering incursions and presentations to Science classes and schools.

Suitability: Years 7 – 10

Repeated in C7

B8 Bytesize Bioinformatics - understanding gene regulation using transcriptomics

Dr Anjali Sahasrabudhe, Dr Rohan Lowe & Dr Harinda Rajapaksha, Outreach Program, La Trobe Institute of Molecular Science

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This workshop, developed in collaboration with researchers and bioinformaticians, shows how to make biological sense of complex bioinformatics data through a user-friendly analysis pipeline.

Delegates Note: Participants to bring their own laptops fully charged.

Suitability: VCE Unit 3

Repeat of A8

B9 Year 12 Biology Revision Techniques

Manolya Mousafa, Lakeview Senior College

Focus on revision and exam preparation techniques to use in revision classes in the lead up the year 12 biology exam, these could also be applied to year 11. I will particularly look at using study guides and assessors reports and differentiating tasks to cater to a range of abilities.

Suitability: VCE Units 3 & 4

Not Repeated

B10 Effective Formative Assessment with Education Perfect

Michael Villanti, Education Perfect

A key recommendation from Gonski 2.0 is the move from summative assessments measured against year level outcomes to more regular formative assessments that acknowledge learning progressions. Of particular importance is the role that formative assessments can have to help students become active partners in their learning journey. One component that makes formative assessment so powerful is the feedback that is provided to students. Feedback is most effective when it is timely and specific. It can be incredibly difficult for a teacher to mark and review every student's responses, efficiencies can be gained through an automatic marking and analysis tool to accelerate the feedback provided to students. This in turn frees up teacher time to further target specific areas to follow up with students. Education Perfect is a resource that has a range of content aligned to the Australian and Victorian Curriculum. It has an assessment tool that can automatically mark and analyse class and student results. Plus overall, it provides the resources to implement effective regular formative assessments in your classroom to empower you as a teacher and encourage a growth mindset in your students. This session will explain how to do this using Education Perfect.

Suitability: All

Repeat of A10 & Repeated in C10

B11 BIOZONE Academy: Online Courses for VCE Biology

Richard Allan, Biozone Learning Media Australia

Find out about BIOZONE Academy - our new digital platform that transforms our popular VCE Biology workbooks into immersive online courses. With the added enhancements of 3D models and curated weblinks to third-party animations, videos and simulations they will provide an exciting interactive experience for students. See how BIOZONE's embedded annotated 3D models allow students to explore biological concepts. Workshop attendees will each receive a free 14-day trial login, plus copies of BIOZONE's 2 titles for VCE Biology.

Suitability: VCE Units 1, 2, 3 & 4

Not Repeated

B12 Modelling Contagious Disease

Clinton Hale - Maribyrnong College

Kahlia Norwood - Blackburn High School

Rupa Oberoi - St Joseph's College Mildura

Ritu Tyagi - Roxburgh College

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Repeat of A13

**Lunch/Displays
12:40pm to 1:40pm**

Session C

1:45pm – 2:30pm

C1 Review of the 2018 Biology Examination and Assessment report

Hugh Latimer, Chief Assessor

The assessment process, 2018 Biology examination and the Assessment report will be discussed and further explanation will be provided

Delegates Note: Participants should bring a copy of the 2018 Biology examination

Suitability: VCE Units 3 & 4

Not Repeated

C2 Using Wolfram tools to advance exploration in Biology

Craig Bauling, Wolfram

The Victoria Department of Education is supplying to all public and private schools the complete Wolfram tools suite including

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Suitability: Years 7 - 10; VCE Units 1-4

Repeat of A7

C3 Biobrain - a Biology learning tool

Caroline Cotton, Cotton Educational Consulting

Biobrain, is a Biology App that helps VCE Biology students understand key biological concepts and test their knowledge with real time feedback on their progress. Students are now be able to learn and revise Biology anytime and anywhere, on their mobile devices. Key Areas of Study are separated into topics and graded over three levels of difficulty. Biobrain uses diagrams and text to illustrate key concepts, and has a variety of question types for students to test their knowledge. Students can also keep track of their scores, review answers, and retake quizzes to ensure full understanding and learning over time. Biobrain's learning materials include links to an illustrated glossary to assist learning without leaving the screen.

All participants will receive a free trial of Biobrain.

DelegateNote: Please bring your mobile device iPhone / iPad or Android device and ensure you know your username and password.

Suitability: VCE Units 1, 2, 3 & 4

Not Repeated

C4 Mobile phones apps that turn primary and secondary students into scientists

Michael Kasumovic, UNSW Sydney/ Arludo

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Suitability: All

Repeat of A4 & B4

C5 VCE Unit 4 , Evolution and DNA Manipulation resources

Michael O'Brien, Newbyte Educational Software

Involve your students in the processes on Evolution and DNA manipulation.

This workshop will give you some great practical ideas on how to integrate modern technologies into your teaching.

You'll have the chance to use stimulating software developed in Australia for the VCE syllabus. Explore evolution from founder effect to speciation. Try DNA manipulation with such techniques as PCR and recombinant plasmids as vectors.

You and your students will receive a FREE access to our online content for 6 weeks!

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Suitability: VCE Unit 2

Not Repeated

C6 Blank

C7 Animal Behaviour: the functional application of learning models to modify and shape behaviour

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Suitability: Years 7 – 10

Repeat of B7

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C8 Jobs of the Future: Teaching Big Data

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Suitability: VCE Unit 1

Repeat of B6

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Repeat of A9

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Suitability: All

Repeat of A10 & B10

C11 Supercharge BIOZONE's VCE Biology series

Richard Allan, Biozone Learning Media Australia

Learn how to make the most of the pedagogical innovations that underpin the BIOZONE books. Explore how collaborative learning, using BIOZONE activities in the classroom, can provide powerful learning experiences. This includes getting the most out of BIOZONE's Teachers Digital Edition and using our enhanced WebLinks - which now also feature annotated 3D models. Lastly, find out about BIOZONE Academy - our new digital platform that transforms our workbooks into immersive online courses. Workshop attendees will each receive free copies of BIOZONE's Biology for VCE Biology - Units 1&2 and Units 3&4.

Suitability: VCE Units 1, 2, 3 & 4

Not Repeated

Meet'n Greet
2:30pm - 3:30pm