

# VCE Chemistry Teachers' Conference 2019

**Wednesday 13 February 2019 at La Trobe University, Bundoora**

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

## Conference Program

7.30am	<b>Registrations Open/Exhibition Viewing</b>	<b>Union Hall and Annexe</b>
9.00am – 9.15am	<b>Welcome by STAV President</b>	<b>Agora Theatre</b>
9.15am – 9.20am	<b>CEA President Welcome – Drew Chan</b>	<b>Agora Theatre</b>
9.20am – 9.40am	<b>VCAA Update Brief Summary – Maria James</b>	<b>Agora Theatre</b>
9.40am – 10.25am	<b>Keynote Address – Rico Tabor, Monash University</b>	<b>Agora Theatre</b>
10.30am – 11.00am	<b>Morning Tea</b>	<b>Union Hall</b>
11.10am – 11.55am	<b>Session A</b>	
12.05pm – 12.50pm	<b>Session B</b>	
1.00pm – 2.00pm	<b>Lunch</b>	<b>Union Hall</b>
2.10pm – 2.55pm	<b>Session C</b>	
3.00pm – 4.00pm	<b>Meet n' Greet</b>	<b>Eagle Cafe</b>

**Delegates NOTE:** B14 and C6 is a Double Session not a repeat.

### 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](http://www.sciencevictoria.com.au/conferences.html)



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

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# VCE Chemistry Teachers' Conference 2019

Welcome by STAV President -  
Soula Bennett  
9:00am – 9:15am

CEA President Welcome -  
Drew Chan  
9:15am – 9:20am

Maria James - VCAA Update  
9:20am – 9:40am

## Keynote 1 Address 9:40am – 10:25am

### New surfactants from plant sources: next generation detergents

Rico Tabor, Senior Lecturer  
ARC Future Fellow  
School of Chemistry, Monash University



Surfactants (more widely known as detergents) are used in almost all industries and formulated products, from shampoo to engine oil, mining to chocolate. However, the building blocks that make the majority of these molecules are currently obtained from unsustainable sources: petrochemicals and palm oil. We have been working to design a new generation of surfactant molecules that can be made with sustainably sourced feedstocks, focusing on locally grown, abundant oilseeds such as canola and safflower. The way that these molecules interact with water and change its properties is essential to their function, and structural tricks can be used to induce desired properties, from efficient detergency for laundry to texture modification for moisturisers in skincare. We will also discuss the properties of fluorinated surfactants (used widely in firefighting foams -- a highly topical issue) and how to use clever chemistry to design their replacements with environmentally friendly alternatives.

*Rico Tabor completed his undergraduate degree at the University of Bristol, UK, and went on to undertake a PhD in the surfactant lab of Prof. Julian Eastoe, graduating in 2009. The topic of his PhD was investigating the kinetics and aggregation of surfactants in non-aqueous solvents, with particular focus on nanoparticle stabilisation. Late in 2009, Rico emigrated to Australia to commence a post-doctoral position at the University of Melbourne, exploring interactions in soft colloidal systems to understand formulation problems using atomic force microscopy.*

*In 2012, Rico took up a lectureship in the School of Chemistry at Monash University. He is currently an ARC Future Fellow and Senior Lecturer, and leads the Soft Materials and Colloids Laboratory within the School of Chemistry. His group's research is focused on several key areas of soft materials and colloidal systems:*

*Novel surfactants and their properties, including pH and light-responsive molecules;*

*Carbon nanomaterials (especially graphene oxide) with particular focus on colloidal and interfacial properties;*

*Applications of neutron, X-ray and light scattering in studies of soft and self-assembled systems.*

*Rico has published nearly 100 papers across a range of topics in surface and colloid science, and works extensively with industry on applications of colloidal systems to practical problems in formulation, food and consumer products.*

## Session A 11:10am-11:55am

### A1 VCAA Update

Maria James, VCAA

A detailed review of all the changes that took place to the curriculum last year and looking forward to implementing improvements.

Not Repeated

### A2 Are you ready for a VCAA Chemistry Audit?

Karen Reid, Broadford Secondary College

How can preparing for an audit improve your teaching?

If you have ever been afraid of the word coming into school that you are about to have an audit, then you may find this session useful.

Having done three subject audits in the last five years for various subjects, I have found them useful in refining my understanding of both the Study Designs, Assessment Advice and the School Policy.

I will share some of the ideas I used, and some of the outcomes that have happened in our school to develop VCE policy.

Bring any queries.

Suitability: VCE Units 3 & 4

Not Repeated

### A3 Yr 10 Chemistry Unit

Pat O'Shea, Loreto College Ballarat

Presentation of a dedicated unit to introduce chemistry to Yr 10 students. I have prepared a booklet that attempts to introduce unit 1 and 2 concepts without stealing experiments from Yr 11. I have focused on making concepts more visual and more sequential than usually presented. Where possible everyday materials are used and an investigative project is included in preparation for Yr 12

Suitability: Years 7 - 10, VCE UNIT 1 & 2

Not Repeated

### A4 Flipped Learning in the Chemistry Classroom

Nicole Volkmann, VolkScience

With the huge amount of content in the Chemistry Study Design, it can be difficult to cover all areas in detail. By 'flipping' the chemistry classroom, students can learn content outside class and then utilise class time to work on problem solving and application of their knowledge. The use of custom made videos, specifically constructed for the new Study Design, will be shown and effective methods of utilising these will be discussed.

Suitability: All

Repeated in B4

### A5 Statistics for VCE Science Teachers

Madeline Toner, La Trobe University

Statistics for Science Teachers is a professional learning program (PLP) designed by academics at La Trobe University for science teachers with limited or no formal training in statistics. The PLP is particularly relevant for VCE science teachers aiming to support students' scientific investigations by improving understanding of data analysis and interpretation, representing and displaying data, identification and treatment of outliers, T-tests, one-way ANOVA, and more. This session provides an overview of the full-day, hands-on program, which explores how Excel can be used to enhance the use of statistics and data analysis.

Suitability: VCE Units 1-4

Not repeated

### A6 Medicine molecular structure: A context for teaching organic chemistry, exploring functional groups, chirality and analytical techniques

Jasmine Lynch, Monash University

This workshop demonstrates ways that teachers can explore key concepts in organic chemistry by analysing the structure of medicine molecules. To avoid the rote learning nature of Unit 4 AOS 1, the analysis of key functional groups and chirality through the narrative of the drug-receptor interaction allows a meaningful understanding of organic chemistry and intermolecular interactions. Furthermore, this workshop will help teachers draw links across areas of study to explore how key analytical techniques such as HPLC, NMR and Mass Spec are used in pharmaceutical science labs every day. Also learn about MFPPS Parkville's free Chemistry workshops and instrumentation tours.

Suitability: VCE Units 1, 2, 3 & 4

Repeated in C4

### A7 Colour is a Matter of Taste

Dr John Bainbridge, Fenton Educational

Introducing new topics to students is almost always done by opening the textbook to a nice colourful page and presenting them with the FACTS. This presentation offers an alternative approach such that the students can do without a text that immediately tells them the answers.

Rather an approach that gives them similar experiences to those of the original theorists.

Suitability: All

Repeated in B7

### A8 Targeted interventions for practice-based learning

Cristy Herron, Aitken College

In this session we will be discussing ideas for developing and implementing classroom activities that are targeted for different skill levels. Using skills based rubrics alongside results data enables the teacher to identify what students should be focusing on in order for them to progress to higher levels of achievement in relation to practical skills. Examples of how this has been done in AOS3 and other practical settings will be shared, and session participants will have the opportunity to apply new ideas to their own teaching practice.

Suitability: All

Repeated in B8

### A9 Biobrain - a new Chemistry learning tool

Caroline Cotton, Cotton Educational Consulting

Biobrain, is a new Chemistry App that helps VCE Chemistry students understand key chemistry concepts and test their knowledge with real time feedback on their progress. Students are now able to learn and revise Chemistry 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.

**Delegate Note:** Participants should bring their own mobile devices (ipad/iphone or Android device) and know their username and password for the Appstore or Google Play Store.

Suitability: All

Repeated in B9

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## 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

## A11 TBA

Mick Moylan

Suitability: All

Repeated in B13

## Session B 12:05pm-12:50pm

### B1 What we have learnt from the students

Veronica Hayes, Dr Cinnamon Lane & Karen Reid, St Michael's Grammar, PEGS & Broadford Secondary College

Aka the practical investigation booby traps

Finding that many of us are choosing electrolysis for the Yr 12 practical investigation we have found that students are finding that the variables are more challenging than they thought. Coming to us with questions such as Why is this black, why won't the metal attach, why does the electrode surface area/distance/concentration/ temperature or agitation change the colour and amount of metal that is deposited?

Rather than the answer "side reactions are occurring" this session looks at brainstorming and trouble shooting the chemistry involved.

So rather than resorting to looking at the energy of the burning of the tiny teddy come along to explore what we as a collective have discovered from our students' explorations. And what we have had to learn to help them.

Share your stories and your queries.

Suitability: VCE Units 3 & 4

Not Repeated

### B2 Teaching Units 1 and 2 Chemistry

Carolyn Drenen and Nicole Dobson, Early Chemistry Careers Network & Mount Alexander College

This session will focus on how you might like to teach Units 1 & 2 Chemistry in 2019.

Come along for some useful information on how to sequence the year from a teacher and student perspective. We will work through Unit outlines, ideas for engaging students with practical activities, demonstrations, writing risk assessments for the laboratory and developing SAC tasks.

This workshop is targeted for Graduate, Early Career Chemistry Teachers or returning teachers to VCE Chemistry. The workshop is being presented by the Early Chemistry Careers Network (ECCN), which is part of the Chemistry Education Association.

Suitability: VCE Units 1 & 2

Repeated in C2

### B3 Teaching Units 3/4 Chemistry

Alexander Colusso & Michelle Roberts, Trinity Grammar School & Whittlesea Secondary College

"This session will support the teaching of Units 3 & 4 from the 2017-2021 VCE Chemistry study design. Main focuses include:

- Sequencing the year from a teacher and student perspective, including unit outlines and scheduling of the AoS3 Practical Investigation.
- Designing and correcting assessments using free digital software to provide feedback on student understanding
- Demonstrations, practical activities
- Use of ICT resources including interactive simulations and the Pearson Lightbook.
- Structured revision activities.
- Design of SAC tasks.

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Suitability: Years 11-12

Repeated in C3

### B4 Flipped Learning in the Chemistry Classroom

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Suitability: All

Repeat of A4

### B5 Using Wolfram tools to advance exploration in Chemistry

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 Chemistry.

Suitability: Years 7 - 10, VCE UNITS 1-4

Not Repeated

## B6 All things AOS3

Dr Adele Hudson, Aitken College

AOS3 has transformed VCE chemistry by giving students an opportunity to engage in authentic scientific research. Whilst there are many benefits of this area of study, there are also some challenges in that students need to apply the key science skills in both the practical investigation and the exam, as AOS3 comprises one fifth of the Unit 3&4 exam. In this session I will show how to build student competency in AOS3 by using pretests to identify student ability levels and then targeted learning activities. I will also show the benefits of using research groups in the practical investigation. This session is suitable for both teachers of Unit 1&2 and Unit 3&4 Chemistry.

Suitability: VCE Units 1, 2, 3 & 4

Not Repeated

## B7 Colour is a Matter of Taste

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Suitability: All

Repeat of A7

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Suitability: All

Repeat of A9

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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

## B11 - Ideas for conducting the Practical Investigation for AOS 3 Unit 4 Chemistry

Louise Lennard, Melbourne Girls Grammar School

The new VCAA Unit 4 Chemistry Study Design includes AOS3, a Practical Investigation regarding energy and / or food. This workshop will look at suggestions for planning, conducting and assessing the Practical Investigation (AOS 3), including student submission of a scientific poster.

Suitability: VCE Units 3 & 4

Not Repeated

## B12 - Fun with ideas and resources for chemistry in the Junior and Senior years.

Peter Razos, Caulfield Grammar School  
VCE and junior chemistry - the resources you need.

We will outline and provide online resources to assist participants in delivering engaging units of work in junior years. Through units such as "The science of magic" and "Bad Science" we can engage students in understanding the chemistry around them and how chemistry is used to entertain and explore their world. Participants will be given full access to the online resources which include VCE Unit 3 and 4 online notes. Participants are encouraged to bring their own device to log onto the internet at [www.dynamicscience.com.au/tester/solutions1/Curindex.asp](http://www.dynamicscience.com.au/tester/solutions1/Curindex.asp). For the VCE we will explore the online assessment facility that allows for the creation of online, self assessed tests to be created.

Suitability: All

Not Repeated

## B13 TBA

Mick Moylan

Suitability: All

Repeated in A11

## B14 Instrumental Analysis - An Overview

**NOTE: THIS IS A DOUBLE SESSION WITH C6**

Phebe Sabbarapu, La Trobe University

This session emphasizes applications of different instrumental analysis techniques with a focus on the VCE unit 2 and unit 4

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study designs. Delegates attending this session will gain hands-on experience using analytical instruments such as Atomic Absorption Spectroscopy (AAS); High Performance Liquid Chromatography (HPLC); and Ultraviolet-visible Spectrophotometry (UV-VIS). In addition, the workshop provides a better insight into practical applications offered as a part of school's Outreach program which could lead to SAC investigations.

Suitability: VCE Units 2 & 4

DOUBLE SESSION WITH C6

**Lunch/Displays**  
**1:00pm – 2:00pm**

## Session C

### 2:10pm-2:55pm

#### C1 Exam Review

Chris Dwyer, Chief Assessor

Review of last year's Exam.

#### C2 Teaching Units 1 and 2 Chemistry

Carolyn Drenen & Nicole Dobson, Early Chemistry Careers Network & Mount Alexander College

This session will focus on how you might like to teach Units 1 & 2 Chemistry in 2019.

Come along for some useful information on how to sequence the year from a teacher and student perspective. We will work through Unit outlines, ideas for engaging students with practical activities, demonstrations, writing risk assessments for the laboratory and developing SAC tasks.

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Suitability: VCE Units 1 & 2

Repeat of B2

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Suitability: Years 11-12

Repeat of B3

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Jasmine Lynch, Monash University

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Suitability: VCE Units 1, 2, 3 & 4

Repeat of A6

#### C5 Model Rocketry in the science classroom

Peter Razos, Caulfield Grammar School

Australia will finally have its own space agency and the interest in rocketry will increase. The fascination with rockets for many students starts in the science classroom with the building of their own model rocket. Participants will be shown how model rocketry is used in the classroom to engage students in the study of forces and energy as well as space science. All participants will be given the opportunity to build and launch their own rocket and experience the thrill of model rocketry first hand.

Suitability: Years 7 – 10

Not Repeated

#### C6 Instrumental Analysis - An Overview

NOTE: THIS IS A DOUBLE SESSION WITH B14

Phebe Sabbarapu, La Trobe University

This session emphasizes applications of different instrumental analysis techniques with a focus on the VCE unit 2 and unit 4 study designs. Delegates attending this session will gain hands-on experience using analytical instruments such as Atomic Absorption Spectroscopy (AAS); High Performance Liquid Chromatography (HPLC); and Ultraviolet-visible Spectrophotometry (UV-VIS). In addition, the workshop provides a better insight into practical applications offered as a part of school's Outreach program which could lead to SAC investigations.

Suitability: VCE Units 2 & 4

DOUBLE SESSION WITH B14

**Meet'n Greet**  
**3:00pm – 4:00pm**