



**Science Teachers Association of Victoria Inc.**

ABN 59 004 145 329

Patron: Associate Professor Misty Jenkins BSc (Hons), PhD, MAICD



# VCE Science Teachers Conference Series 2022

## CHEMISTRY

**16th February 2022**

All sessions will be recorded and available to view until late 2022

### Perspectives on Practice: Sustainability Matters

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#### Welcome to VCE Chemistry Teachers 2022 Online Conference

##### President's Welcome

Welcome to the VCE Chemistry 2022 Online Conference. We have an exciting, diverse and engaging program with a mix of live and pre-recorded presentations and workshops. We have two keynote speakers this year. Professor Antonio Patti will open the conference with a timely keynote 'Green Chemistry – Addressing the UN Sustainable Development Goals'. The second keynote, Dr Yvonne Mah, Business Development Manager, Plastics Additives Australia and New Zealand, BASF will present on 'Creating Chemistry for a Sustainable Future'.

There will be three live sessions with eighteen choices of workshops covering curriculum, pedagogy, assessment, technology as well as extension topics. The live program concludes with the VCAA Update and a review of the 2021 VCE examination led by Chief Assessors' Peter Skinner and Chris Dwyer.

In addition, there will be the opportunity to network with colleagues and to access multiple pre-recorded presentations on-demand. All sessions will be recorded and available for viewing after the conference, providing you with a great ongoing resource.

Finally, thank you for participating in this conference, thus ensuring you stay fully informed of the key issues in the VCE sciences. We trust you will enjoy and find the sessions interesting and rewarding.

Alexandra Abela, President, Science Teachers Association of Victoria Inc.

# Synchronous Sessions

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## Live on 16th February 2022

### 8.45am - 8.55am Welcome

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**Welcome, Acknowledgement of Country & Housekeeping: Alexandra Abela, STAV President, and CEA President**

**Introduction of Keynote Speaker 1**

### 8.55am - 9.40am Keynote Address 1

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**Professor Antonio (Tony) Patti , FRACI. Director, ARC Industrial Transformation Training Centre - Green Chemistry in Manufacturing, Monash University**

**‘Green Chemistry – Addressing the UN Sustainable Development Goals’**

Advances in chemistry and chemical engineering have shaped our world from pharmaceuticals and food production, to the clothes we wear, the homes we live in, the cars we drive, our cosmetics, cleaning products, and so much more. However, we now know that continuing to manufacture as we did in the past is unsustainable. Today’s new world and the global problems we face with climate change and resource depletion demands a new approach.

Green chemistry is a paradigm shift. The Green Chemistry principles can be applied across all sectors involving chemical manufacture. It is about how we should “think about and do chemistry”, so that we avoid hazardous materials and products, develop new production methods, utilise renewable resources, recover, reuse and repurpose materials when the initial application has expired hence encompass circular economy thinking and minimise energy requirements in all manufacturing. This shift in how we manufacture will not only bring environmental benefits and mitigate climate change, but will also bring economic and social benefits. Several examples of how green chemistry is being implemented to achieve these goals will be provided.

Furthermore, if we look at UN Sustainable Development Goals (UN SDGs), one can identify where Chemistry can play a positive role in addressing many of the goals directly. Indeed, it can be argued that those UN SDGs that are not obviously addressed directly can be addressed indirectly. Green Chemistry principles should be integrated across all the curriculum of chemistry at whatever level chemistry is taught and demonstrate to future generations, the central role that the chemical sciences and related engineering will play in ensuring a sustainable future for our planet.

## 9.40am - 10.25am Keynote Address 2

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### Introduction of Keynote Speaker 2:



**Dr. Yvonne Mah PhD FRACI CCHEM**

**BASF Australia Ltd**

**Business Development Manager, Plastic Additives Australia and New Zealand, BASF**

**Creating Chemistry for a Sustainable Future**

Never before, has Chemistry been at the forefront of society's quest for solutions to achieve sustainability. While the knowledge of Chemistry continues to bring innovations, it also has great impact on the race for sustainable solutions needed now. Sustainability is about ensuring that our activities do not incur a negative effect to the environment of our current and future generations. We look to Chemistry to help solve this. Looking from a few perspectives, we discuss the needs of society and the environment, UN's goals, circular economy, chemistry of materials and a corporate view of carbon management.

## 10.25am - 10.50am Morning Tea

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## Session A 10.50am - 11.35am

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### A1 Cristy Herron, Geelong Grammar School

#### Moving away from test-style assessment tasks in Year 11 Chemistry

With the implementation of the new study design quickly approaching, I've been thinking about how I need to shift my practice away from test-style assessment tasks in year 11 in order to prepare them for the variety of SACs they will encounter in year 12. But how do we prepare them for the exam if none of the assessment tasks are exam-style?

In this session we will explore ideas for assessing students in a variety of ways in year 11, while still teaching students the value of building their exam-taking skills, even if they are not assessed.

#### Synchronous Stream 1

### A2 Pat O'Shea, Loreto College Ballarat

#### Indigenous Science

There has been considerable interest in recent years in the scientific techniques used for centuries by Australian and Torres Strait Islands people. From flour milling, to plant extracts, to aquaculture, it is very evident that indigenous Australians have an advanced understanding of many scientific techniques and practices.

This session will provide some exciting examples of this science such as glue making, extraction of medicines from plants and separation techniques. ACARA has mapped indigenous understandings against the Australian science curriculum and many of the topics are easily incorporated in junior science.

#### Synchronous Stream 2

### **A3 Carolyn Drenen, Lalor North Secondary College and Nicole Dobson, Whittlesea Secondary College**

#### **Teaching Units 1 and 2 VCE Chemistry**

This session will focus on how you might like to teach Units 1 & 2 VCE Chemistry in 2022. We will provide 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. This on-line workshop is being presented by the Early Chemistry Careers Network (ECCN), which is part of the Chemistry Education Association (CEA).

#### **Synchronous Stream 3**

### **A4 Maria James, VCAA**

#### **Assessing scientific literacy through a media analysis task**

Scientific literacy has been defined in various ways but is generally considered to be the knowledge and understanding of scientific concepts and processes required for personal decision making, participation in civic and cultural affairs, and economic productivity. How can this be assessed at a VCE level?

In this workshop, participants will use provided media articles to develop assessment tasks that are compliant with VCE assessment principles. We will explore the assessment of four aspects of scientific literacy: knowledge of science, the investigative nature of science, science as a way of knowing, and the interaction of science, technology and society.

#### **Synchronous Stream 4**

### **A5 Joanne Tanner, Monash University, Department of Chemical and Biological Engineering and Dr Simon Corrie, Monash University, Department of Chemical and Biological Engineering**

#### **The Monash Engineering Student Pilot Plant: delivering fundamental concepts through hands-on experience**

Monash is training the next generation of Scientists and Engineers, equipping them with the theoretical knowledge, practical problem solving, and systems thinking skills they will need to excel in their chosen careers. Our perspective on practice is that nothing beats practical experience when it comes to engaging students and demonstrating theoretical concepts. We have therefore developed our Student Pilot Plant based on the widely industrially applicable process of wastewater treatment.

The pilot plant demonstrates key scientific and engineering concepts while promoting environmental and sustainability principles. As well as the process itself, the facility also features an industrial-style control room, remote accessibility, smart sensors and IoT devices, and augmented reality. This combination provides an authentic, inclusive experience, and the level of complexity of activities is easily scalable, making the pilot plant a great way for secondary students to get a taste for industry and link theory to practice.

#### **Synchronous Stream 5**

### **A6 Caroline Cotton, Biobrain and Paige Maccabee, Haileybury**

#### **BioBrain - a new innovative platform to use to teach your VCE Chemistry students**

Looking for a new way to engage your students? Come to this session to learn about the new BioBrain platform!! With both a teacher and student interface work can easily be assigned to students and results are available immediately to both teachers and students with automatically marked quizzes. Interesting and contemporary case studies provide great examples of key concepts. Use BioBrain for flipped learning, teaching your class or as a revision tool to test understanding of key concepts.

#### **Synchronous Stream 6**

## 11.35am - 11.40am Short Break

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## Session B 11.40am - 12.25pm

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### B1 Adele Hudson, Aitken College

#### **Making connections across Year 11 and 12 Chemistry: What skills and understandings are essential for students in VCE Chemistry?**

In this workshop I will show how to strengthen students foundational understanding by focusing on the key ideas. I will also demonstrate how mapping skills across Units 1 - 4 Chemistry and using common rubrics and language across all sciences can streamline student learning.

#### **Synchronous Stream 1**

### B2 Mick Moylan, School of Chemistry, University of Melbourne and Emily Rochette, Melbourne Graduate School of Education, University of Melbourne

#### **Smartphone Spectroscopy**

In this hands-on, online workshop, we will show how to incorporate digital technologies into your chemistry classroom so your students can use smartphones to collect and analyse absorbance data on coloured solutions. Although we will supply some sample data, we hope you could gather some common materials and collect your own! This will mean that you can evaluate this practical investigation for possible use with your classes. Time will be devoted to data collection in the workshop. Here are the things that you will need to prepare prior to the workshop:

- 5-6 standard solutions of copper sulphate (0.1M, 0.2M, 0.3M, 0.4M and 0.5M with water as a blank) or
- 5-6 solutions prepared from a dilute stock solution of \* 1-2 drops red food colouring in 250 mL water, (further diluted to 10%, 20%, 30%, 40 and 50%)
- a toilet paper tube or similar cardboard cylinder
- scissors, and sticky tape
- at least one cuvette
- a computer to use with this website: <https://academo.org/demos/wavelength-to-colour-relationship/> This will allow you to select a wavelength of light to pass through the samples.
- a mobile phone with the "Color-meter" (Apple Store) or "RGB Colour Detector" (Google Play Store) app installed.

#### **Synchronous Stream 2**

### B3 Julie Mulholland, ANSTO and Bridget Murphy, ANSTO

#### **A different way to look at unstable atoms using real-world data**

Students often think that unstable atoms are an oddity, special or rare. But unstable atoms are all around us – in the air we breathe, in the food we eat, in the buildings we live in, part of our own bodies.

This workshop will explore an ANSTO Education resource that allows students to investigate atomic number, mass number, isotopes and relative atomic mass using real-world data. Use data processing activities and key science skills to process and analyse student-friendly data about naturally-occurring isotopes of the first twenty elements.

We'll discuss how teachers might use this resource to address content in Unit 1 Areas of Study 1 and 3, as well as general capabilities like ICT skills, problem-solving as well as critical and creative thinking

#### **Synchronous Stream 3**

## **B4 Sam Watkins, Geelong Grammar, Billie Murray, St Francis Xavier College, and Lisa Chiavaroli, Monash University**

### **Instructional strategies for comprehending experimental design vocabulary in the VCE chemistry classroom**

VCE Chemistry students are often asked to comprehend scientifically dense experimental design vocabulary for both learning and assessment. Many secondary students lack the complex skills required to successfully decode scientific text in the discipline of chemistry, because general comprehension strategies do not address the unique language of chemistry. Groups of VCE Chemistry teachers participated in a co-designed professional learning project that provided research-informed instructional strategies to support students with discipline-specific comprehension.

In this workshop, teachers will share the strategies they have used and also reflect on the successes and failures of implementing these strategies during remote learning.

#### **Synchronous Stream 4**

## **B5 Maria Hawkes, Aquinas College, Marc Heron, Balcombe Grammar School and Seamus Delaney, Deakin University**

### **Teaching strategies situated around the four levels of chemical knowledge (Johnstone's triangle plus the Human element)**

In this workshop, teachers will share the strategies they have used to incorporate the 'human element' into various topics with their students. Students were prompted to explore and describe their chemical knowledge at the three levels of Johnstone's Triangle (Macro, sub-micro and symbolic levels) as well as a fourth 'human element' level, helping students to link chemical concepts with real-world scenarios and societal implications. These VCE Chemistry teachers participated in a co-designed professional learning project that provided research-informed instructional strategies to situate societal implications in the chemistry classroom. They will reflect on the successes and challenges of implementing these strategies and will provide insights for the design of future curricula to encourage student engagement.

#### **Synchronous Stream 5**

## **B6 Nic Volkmann, VolkScience**

### **Flipped Learning in the Chemistry Classroom**

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 current Study Design, will be shown and effective methods of utilising these will be discussed.

#### **Synchronous Stream 6**

## **12.25pm - 1.05pm Lunch Break**

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### **Networking Room Open (STAV Alpha)**

## Session C 1.05pm - 1.50pm

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### **C1 Cristy Herron, Geelong Grammar School**

#### **Rote vs Rigour – What’s the difference?**

First of all, what is rigour? In this session, the term ‘rigour’ will be dismantled for educators in an effort to debunk some of the associated myths about rigorous learning, based on the current research. Sample learning tasks will be examined against a rigour-relevance framework, and comparisons will be made between rigorous and rote learning. Perspectives and ideas from teachers in the field that were put forward at 2021 STAVCON will also be incorporated into the session.

#### **Synchronous Stream 1**

### **C2 Pat O’Shea, Loreto College Ballarat**

#### **Resourcing a new study design**

This session will comment on any new theory teachers will need to brush up on in preparation for the new study design and some examples of possible assessment tasks.

#### **Synchronous Stream 2**

### **C3 Adele Hudson, Aitken College**

#### **Critical thinking in VCE Chemistry**

VCE Chemistry provides the perfect opportunity for students to develop critical thinking skills. In this workshop I will showcase strategies teachers can use in Year 10 Chemistry, Units 1&2 and Units 3&4 Chemistry to build skills in applying knowledge, evaluating and analysing ideas and creating new understandings. Giving focus to these areas shifts the classroom culture to one where students understand the ‘big ideas’ and can make connections across the curriculum.

#### **Synchronous Stream 3**

### **C4 Janine Hulston, Aquinas College, Seamus Delaney, Deakin University and Maria Hawkes, Aquinas College**

#### **A future-oriented, hands-on chemical science practical inquiry – making sustainable concrete**

Teachers in this workshop have designed and implemented a hands-on practical investigation that directly relates to the critical challenge of sustainable development. Students compare the strength and properties of concrete samples made either from finite resources or recycled materials. Sustainability will be an increasing component of the VCE Chemistry curriculum, including assessment tasks, and investigations such as this empower students to engage with the material basis of society. Being a material so inextricably linked to society, a lot of outstanding contemporary science research and industrial innovation is exploring ways of making the chemical process of concrete production and utilisation more sustainable. Resources and strategies to incorporate this practical activity into 7-12 Science will be discussed.

#### **Synchronous Stream 4**

### **C5 Melissa Maceoin, St Margaret’s Berwick Grammar**

#### **Teaching Organic Chemical Pathways in Unit 4 Chemistry**

Do your students find this part of the course difficult to absorb? Are they daunted by the many reactions and conditions they need to remember? In the past few years I have fine-tuned the way I lead my students through this process, and am happy to share what I do. By the end of the lessons in question the class have created a giant ‘floor model’ flowchart, using molecular models, post-its and index cards. I will also share some reflections on how this seems to help my students understand and learn this material. The presentation will take you through the set of lessons, and you will take away a written plan. This session would be particularly good for beginning teachers.

#### **Synchronous Stream 5**

## **C6 James Kennedy, Oxford University Press and Carolyn Drenen, Oxford University Press** **Preparing for the new VCE Chemistry Study Design**

Join Oxford authors and experienced Chemistry teachers James Kennedy and Carolyn Drenen as they discuss the new VCE Chemistry Study Design due for implementation in 2023. This session will compare the upcoming Study Design to the current version and consider how we can prepare students to succeed in both Chemistry SACs and exams. There will be an interactive Q&A at the end of the session.

**Synchronous Stream 5**

**1.50pm - 1.55pm**      **Short Break**

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## **Session D**      **1.55pm - 2.35pm**

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### **D1 Maria James, VCAA**

#### **VCAA Update – revised Chemistry study design**

The VCE Chemistry Study Design was reviewed in 2021 and implementation will begin in 2023. This session will present an overview and rationale for the changes to both content and assessment. The program of implementation activities for 2022 will be outlined, with a shift being towards online delivery.

**2.35pm - 2.40pm**      **Short Break**

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## **Session E**      **2.40pm - 3.40pm**

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### **E1 Chief Assessors, Peter Skinner & Chris Dwyer**

#### **Exam Report and Q&A**

**3:40pm - 3.45pm**      **Closing remarks**

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**Alexandra Abela, STAV President**

**3:45pm - 4:30pm**      **Post conference networking**

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**(STAV Alpha Zoom)**

# Asynchronous Sessions

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available to view from 9th February 2022

## AS1 Pat O'Shea, Loreto College Ballarat

### Where is chemistry used?

What do you tell your students when they ask - where is chemistry used? In 1970, about 90% of our chemists worked in petrochemical complexes such as Altona in Melbourne and Botany in Sydney - now most of those are gone. Fortunately innovation in science is alive and well. This session will cover some of our main current industries and the chemistry behind their processes. Each industry is also presented as a poster.

## AS2 Adam Di Blasi, Edrolo

### Sharing Year 7 strategies for end of school success.

Edrolo is building an all-in-one comprehensive Year 7 Science resource focused on developing scientific conceptual understanding, building scientific literacy and inquiry skills. In this session, teachers will be guided through how they can set up their Year 7 students for end of school success, and learn about the consistent conceptual approach Edrolo takes to teaching Science. You will receive a free workbook to take from the conference to the classroom to experience the difference first-hand. All attendees will also have the opportunity to apply for a full access trial to Edrolo.

## AS3 Nicole Dobson, Whittlesea Secondary College

### So you've been given a combined year 11 and year 12 chemistry class...

From a teacher who is going into her second year of taking a combined chemistry class who has grappled with the ordering, research, delivery and challenges that come with teaching a combined unit  $\frac{1}{2}$  and  $\frac{3}{4}$  class. Find out more about one approach to tackling this issue and how to come out sane the other side.

# Presenters

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## Alexandra Abela

Alex is the President of the Science Teachers' Association of Victoria.

She has been a continuous member of STAV since joining as a pre-service teacher in 1993. Since first joining STAV Council in 2001, Alex has held a number of Executive roles, and she is currently STAV's representative on the board of the Australian Science Teachers Association.

Alex has held a variety of leadership positions in science education throughout her career.

She is passionate about curriculum design, committed to innovation in teacher professional learning, and loves teaching students of Chemistry at Penleigh and Essendon Grammar School.



## Lisa Chiavaroli

Lisa works as a research assistant for the Deakin University Chemistry Education Professional Learning communities project (DeCEPL). In addition to this role, she consults on a range of Science and STEM education projects for Catholic Education Melbourne.

Lisa is a PhD student at the Faculty of Education, Monash University and is recent recipient of the Peter Fensham PhD Scholarship for Research in STEM. She has 10 years of classroom experience teaching VCE Biology, VCE Chemistry and Science.



## Simon Corrie

Simon's research interest is focused on developing nano-particle-based molecular sensors and contrast agents for monitoring biological molecules in real biological environments. The Nano-sensor Engineering Lab works on the design, synthesis, characterization and testing of both synthetic nano-particles polymers, and biomolecules (e.g. peptides, proteins, antibodies) to detect and report the concentration of important disease biomarkers, in a real-time or rapid manner. This requires an interdisciplinary approach, combining aspects of materials science, chemistry, and molecular biology to create the materials, and then collaborate with Australian and international colleagues to test the materials in preclinical animal models or human samples.



## Caroline Cotton

Caroline is an experienced Biology and Chemistry teacher who has developed an interactive online STEM Education platform for Biology, Chemistry, and Physics teachers and their students.



## Seamus Delaney

Seamus Delaney (@delaneysw) is a Lecturer in the School of Education, Deakin University, where he teaches Chemistry, Primary and Secondary Science pre-service teacher education. He is currently Secretary of the Chemistry Education Association, and recently co-founded the Elements of Sustainable Chemistry interdisciplinary research hub.

Hannah Vu, Oli Taylor and Adlin Ramdzan are all VCE Chemistry teachers who in 2020 were part of the Deakin University chemistry education professional learning communities project (DeCEPL), financially supported by the CEA. In this PL project, they co-designed an innovative classroom activity with teachers from different schools and the project team, incorporating the latest chemistry education research.



### Adam Di Blasi

Adam is a former leading teacher who moved to Edrolo 3 years ago bringing a wealth of knowledge with him after being in the classroom for over 10 years.



### Carolyn Drennan

Carolyn Drennan has been teaching VCE Chemistry and Science in secondary schools for the past 9 years, currently at Lalor North Secondary College. In her role as ECCN Committee Member, she has presented workshops at VCE Chemistry Conferences since 2015 and also connects with Pre-Service Teachers in her role of University Liaison. She has also authored the OUP Student Workbook for the Units 3 and 4 *Chemistry for Queensland* series

### Chris Dwyer



### Nicole Dobson

I am a chemistry educator and learning specialist in curriculum at Whittlesea Secondary College and former president of the Early Careers Chemistry Network. I cannot shake the thought that if you do not do something to change the education system, then you are accepting the education system as it is and I am so excited by innovation and new ways to teach and learn. Always happy to share resources and swap ideas, so please get in touch!



### Maria Hawkes

Maria Hawkes is a VCE Chemistry and Junior Science teacher at Aquinas College, Ringwood for the past two years. Maria only made the change to teaching 5 years ago, after working in industry and 13 years involvement in her children's school. Having an industry background Maria strives to help students link the theory to concrete applications in the world and the potential impact on society. Making sure there is plenty of fun along the way to help inspire a love of the sciences and encourage more students to undertake senior science studies.



### Cristy Herron

I am an enthusiastic Chemistry and General Science teacher, and Head of Science at Geelong Grammar School. Creating exciting and inclusive learning programs for students is my passion. I believe all students can enjoy Science and experience success, no matter their career paths. When I'm not working, I enjoy a variety of outdoor pursuits, especially rock climbing, as well as spending time with my husband Nick, and our two children Xavier and Emilia.



### Marc Heron

Marc Heron is a VCE Chemistry teacher at Balcombe Grammar School for the past 11 years. He also teaches general science and is currently Head of Year 11. Marc has a particular interest in helping students to link the theories they study to what they can observe and societal implications.



## **Adele Hudson**

Adele teaches VCE Physics and Chemistry and General Science at Aitken College and is also Head of Science. She has developed a range of tools to identify the skills that students require in VCE Science exams. With the move towards high level thinking skills in all the sciences, she has worked with others on developing project based learning experiences in Year 10 and 11 that strengthen students skills in these areas. All those involved in the project have found the quality of work has improved due greater student motivation which has also resulted in higher participation rates in VCE Science.



## **Janine Hulston**

Janine Hulston is a middle years science teacher at Aquinas College, Ringwood. Janine recently joined the teaching profession after having worked close to twenty years as a research scientist and senior process chemist. Janine is passionate about STEM education and sharing her industry experiences to make science relevant to student's lives. Janine is particularly passionate about inspiring girls in developing a love for and can-do attitude towards STEM-based learning and to break down gender stereotypes.



## **Maria James**

Maria is the Science Curriculum Manager at the Victorian Curriculum and Assessment Authority, having previously held school positions including Head of Science, Dean of Students and Head of Senior College. Maria holds a Masters degree in Education and has written junior science and senior chemistry textbooks. She is passionate about motivating and engaging students with science. A particular interest for Maria is encouraging students to apply their knowledge and skills in science and in other areas to take action in local and global contexts.



## **James Kennedy**

James Kennedy has been a VCE Chemistry teacher for nine years at schools including Haileybury, Loreto, Monash College and Wesley. He has a wealth of experience in science communication and speaks at corporate events about how to tackle an irrational fear of "chemicals". His latest book, Everything Is Natural, was published in 2021 with the Royal Society of Chemistry.

## **Paige Maccabee**

Paige is a passionate VCE Chemistry teacher at Haileybury and Head of Year 10 Science.



## **Melissa MacEoin**

Melissa is a chemistry teacher from St Margaret's and Berwick Grammar School, Berwick. She has been teaching for too many years to mention, but still loves the sheer joy that can come from introducing students to the wonders and mysteries of chemistry. Melissa also has a background in English, and drama and theatre, and enjoys the way chemistry requires students to view and analyse the world from so many perspectives. Melissa is currently serving as president of the Chemistry Education Association (CEA).



### Yvonne Mah

Yvonne Mah has a PhD in Chemistry and has worked for the chemical company, BASF for over 20 years. She began as a Graduate Application Development Chemist in the Engineering Plastics Division. From there she has experienced various roles as Technical Service Engineer to Technical Marketing for the Asia-Pacific region based at the headquarters in Hong Kong. She is a Fellow of the Royal Australian Chemical Institute. After living abroad and travelling extensively in the Asia-Pacific region and seeing the chemical industries first hand, Yvonne volunteers to different organisations as a way to share her experience and give back to the community. She spends her time in the Women in Chemistry Group, Mentoring, Diversity and Inclusion, Polymer Division and Victorian Curriculum and Assessment Authority Committees. Yvonne is also a recent committee member as Program Chair in the Society of Plastic Engineers.



### Mick Moylan

Mick Moylan is a Senior Lecturer in Chemistry at the University of Melbourne and also Project Officer for the Chemistry Education Association. Mick currently runs lab programs where Year 11 and 12 students use the instruments in Units 2 and 4 chemistry and has spent hundreds of hours in school classrooms in his former roles at the University and in CSIRO Education. In his tertiary teaching, Mick is a coordinator of the BSc(Extended), which is a degree program for talented Aboriginal and Torres Strait Islander students. Mick also teaches subjects within the chemistry major at the University, with a particular focus on the secondary-tertiary transition.



### Julie Mulholland

Julie is an Education Officer from Australia's Nuclear Science and Technology Organisation (ANSTO). She is a highly experienced science educator, having over 30 years of experience teaching science, senior chemistry and senior physics in NSW high schools, as well as 14 years as a Head Teacher Science. In 2013, she achieved a NSW Education and Communities Minister's award for excellence in teaching. Julie is instrumental in developing ANSTO's data set resources for high school students.



### Bridget Murphy

Bridget Murphy has a background in biological science research and science education at secondary and tertiary levels. Bridget is the Education Manager at the ANSTO Discovery Centre and is responsible for developing and delivering new programs for high school students and professional development for secondary teachers.



### Billie Murray

Billie Murray is a VCE Chemistry and Biology teacher at St Francis Xavier College in Beaconsfield.



### Pat O'Shea

Pat has been providing support material for chemistry teachers for many years. He has been following up the research of the CSIRO and several universities on the many applications of science our indigenous Australians have used for centuries.



### Peter Skinner

Peter is currently a Year 11 and 12 VCE and IB Chemistry teacher at Geelong Grammar School and has been co-Chief Assessor for both 2019 and 2020, and has been a VCE assessor since 2004."



### **Tony Patti**

Director – ARC – Industrial Transformation Training Centre – “Green Chemistry in Manufacturing” – 2020 - present

Course Director – Master of Green and Sustainable Technologies – 2019-present

Associate Dean – International, Faculty of Science, 2017- mid 2020

Associate Dean (Research Training), Faculty of Science, 2001-2014

Co-director – Chemicals and Polymers Graduate Research Industry Partnerships (GRIP) Network and PhD training program, 2015-present

Associate Professor 2008-2017

Professor 2017 -

Current and past research areas

The chemistry and applications of natural organic matter including, valorisation of biomass from various sources, mainly from food production and consumption, applications of green chemistry for biomass extraction, processing and chemical transformations; chemistry of soil organic matter and carbon sequestration in soils; formulation of efficient organic based fertilisers and applications of green chemistry in agriculture.



### **Emily Rochette**

Emily is a classroom science teacher and lecturer at The Melbourne Graduate School of Education. Her research interests are situated with understanding teachers' use of digital technologies in the science classroom as they teach both in- and out-of-field.



### **Joanne Tanner**

Dr Joanne Tanner is a chemical engineer with industry experience in control systems design and configuration (Honeywell) and pilot and industrial scale process design (HRL Technology). She holds a PhD in reaction engineering, and is a lecturer, researcher and Director of the Engineering Student Pilot Plant in the Monash University Department of Chemical and Biological Engineering. Joanne's research focusses on sustainable bioresource processing and utilisation from macro- to micro-scale. She is passionate about authentic, inclusive education, and believes that connecting theory to practice to improve the student experience should begin as early as possible to promote science literacy and awareness.



### **Nic Volkmann**

Nic is an experienced VCE Chemistry teacher with a passion for Flipped Learning. This led to the creation of VolkScience, where her mission is to provide affordable access to high quality VCE Chemistry Units 1-4 video tutorials & resources to support teaching and learning for both teachers and students.



### **Sam Watkins**

Sam Watkins is a IB Chemistry teacher at Geelong Grammar and has taught VCE Chemistry previously at Government and Independent Schools in Victoria.