VCE Physics Teachers' Conference 2018

Friday 16 and Saturday 17 February 2018 at La Trobe University, Bundoora

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

Conference Program - Friday 16 February

7:30am - 8:20am	**Registration**	Union Hall Annexe
8:20am - 8:30am	**Welcome by STAV and VicPhysics**	Union Hall
8:30am - 9:20am	**Chief Assessor's Report - Andrew Hansen**	Union Hall
9:20am - 10:00am	**Small Group Discussions in Union Hall**	
10:00am - 10:15am	**Maria James – VCAA Update Summary**	Union Hall
10:15am - 11:15am	**Morning Tea - Sponsored by Education Perfect**	Union Hall
11:15am - 12:15pm	**Session A**	
12:15pm - 1:15pm	**Lunch**	Union Hall
1:15pm - 2:05pm	**Keynote Address – Dr Eric Thrane - Data Theme Leader, ARC Centre of Excellence for Gravitational Wave Discovery (OzGrav), Monash University**	Union Hall
2:15pm - 3:15pm	**Session B**	
3:15pm - 3:40pm	**Afternoon Tea**	Eagle Café
3:45pm - 4:45pm	**Session C**	
4:45pm - 5:30pm	**Meet 'n Greet**	Eagle Café

Conference Program - Saturday 17 February

9:00am	**Australian Synchrotron** - Clayton (1 hour)
11:00am	**Medical Physics In-Service at Peter MacCallum Cancer Centre** - East Melbourne (2 hours)
2:00pm	**Victorian Space Science Education Centre** - Strathmore (90 minutes)

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**

Vicphysics Teachers' Network Inc.
www.vicphysics.org

Science Teachers' Association of Victoria Inc.
VCE Conference Series 2018

Postal Address: PO Box 109 Coburg VIC 3058

Phone: (03) 9385 3999 • Fax: (03) 9386 6722
Email: stav@stav.vic.edu.au • Website: www.sciencevictoria.com.au

VCE Physics Teachers' Conference 2018

Registration
7:30am – 8:20am

Welcome
8:20am – 8:30am

Chief Assessor's Report - Andrew Hansen
8:30am – 9:20am

Does the new exam structure change the way students respond?

2017 sees the new study design and a new exam structure. Past Chief Assessor reports have been able to highlight ongoing areas of difficulty for our students and review particularly challenging questions and the student's approaches. The 2017 exam introduced some new material and removed the sectioning of the exam into areas of study. This Chief Assessor report will discuss any new areas of difficulty for students as well as review concepts that still pose problems.

Small Group Discussions
9:20am – 10:00am

The small group discussions will complement the keynote address, with teachers allocated questions to discuss from the exam that have been done poorly. Some specific strategies will be suggested. The group will discuss these and develop others for addressing the content of the questions. Drawing upon their experience, the group will develop a proposal including suggested practical and problem solving resources that can be shared.

Maria James - VCAA Update Summary
10:00am – 10:15am

Morning Tea sponsored by Education Perfect
10:15am – 11:15am

EducationPerfect

Session A
11:15am – 12:15pm

A1 Practical Investigation: Using Log-books and Rubrics to Scaffold Inquiry

Dino Cevolatti & Stuart Bird, Castlemaine Secondary College

The focus of this session will be on, how structured Log-books, Rubrics, and similar tools, can be used in the classroom to support students in engaging effectively in the inquiry process. We will begin with a presentation of the commercially available (QATs) structured Log-book and accompanying Rubric for the Unit 4 Outcome 3 Practical Investigation. This will include details about how and why they were constructed in the way that they were. The session will end with a workshop exploring strategies to address the obstacles to inquiry learning in VCE Physics.

Delegates Note: Commercial Work being presented as part of the session is from Quality Assessment Tasks (QATs) but the session does not rely on this material

Repeated in B1

Suitability: VCE Unit 2 & 4

A2 Physics 7-10: From assessment to Marzano-based teaching plans and student work.

Neil Champion, Buckley Park College

Some physical sciences units will be unpacked to show how they were developed, Marzano-friendly teaching plans constructed, and assessment-tasks can be completed progressively by students in class time.

Delegates Note: Delegates may need to access a website on their laptops or mobile phones for details of materials to be used during the session.

Suitability: Years 7 - 10

A3 Teaching Einstein's Relativity in Unit 3

Jill Detez, Presbyterian Ladies' College

An overview of how I teach Einstein's Special Relativity in Unit 3 Physics. This session is designed for teachers new to teaching this topic. Aspects covered will be timing, depth and how to make this topic accessible to students.

Suitability: VCE Unit 3

A4 Uncertainty, Accuracy and Reliability of results in Year 7 to 10 Science

Terry Tan, Copperfield College & Bronwyn Quint & Jocelyn Smith, Mulluana Secondary College

In Science experiments, students use tools to ascertain the quantity they are working with. At the year 7-11 level, students have worked with issues directly relating to the uncertainties, accuracies and reliabilities in measurement. In this session, strategies and activities would be provided to help students think about how uncertainties, accuracies and reliabilities in the experimental process would be developed to aid students in thinking about these issues in preparation for the year 12 Unit 4 topic.

Repeated in B4

Suitability: Years 7 - 10; VCE Units 1 & 2

A5 Tips and hints for beginning teachers

Colin Hopkins, Retired Teacher

Recently retired from Head of Science at Bialik College, Colin will share tips and hints for engaging students in VCE Physics. Useful resources will be shared, so bring a laptop.

Delegates Note: Preferable to bring along a device to download resources from a USB stick.

Repeated in B5

Suitability: VCE Units 1, 2, 3 & 4

A6 Practical Activities for Teaching U3 AOS 1 Fields

Barbara McKinnon, Kew High School

Find out how to construct an "electric field compass" using cellotape and many other useful demonstration and experiment ideas for enhancing the teaching of the properties of electric, magnetic and even gravitational fields.

Repeated in B6

Suitability: VCE Unit 3

A7 How fast can you run? As fast as a leopard...

Spiro Liacos, Cheltenham Secondary College

Do you want to inject a little more real-world Physics into your classroom? In this session, you will compare Usain Bolt's 100m sprint with your own 100m sprint, find out how fast you can kick a ball, analyse the motion of NASA's Space Shuttle as it blasts into orbit, and a whole lot more. Activity sheets will all be provided.

Suitability: Years 7 - 10; VCE Unit 2

A8 A detailed study- using webpages to assess the detailed study

Kathryn Grainger & Dr Penny Hale, John Monash Science School & Wellington Secondary School

How do you teach and assess a detailed study when there are so many different options? Answer- get your students to do the work for you and assess their "teaching" materials.

Suitability: VCE Unit 1

A9 How to make a working model of a DC motor & EPI related with sound topic

Gracie Saxena, Manor Lakes P 12 College

Suitable for VCE Physics, Unit 3, How are fields used to move electrical energy?

AIM - To build a working model of Electric Motor and develop understanding re

*Various components of a simple DC motor

*The operation of a simple DC motor, including the role of the commutator (slip rings)

*Magnetic force experienced by a conductor and a non-conductor when placed in magnetic field

*Interaction between the magnetic field of the magnet and the magnetic field generated around a conductor carrying current- Main principle used for Electric Motors Other EPI topics used this year- 1.Design, build, test and evaluate a device- DC motor 2. Explanation of the operation of a device- DC motor Dissect a small motor and compare with the one built 3.To measure the speed of sound through water using resonance tube.

Repeated in C5

Suitability: VCE Units 3 & 4

A10 Designing VCE Assessment Tasks That Are Not Just Examination Mimics

Maria James, VCAA

Although schools are increasingly turning their attention in upper primary and lower secondary years to teaching and assessing what is variously termed as capabilities, enterprise skills, 21st century skills and/or future work skills, such attention is not reflected in the selection of School-assessed Coursework (SAC) tasks in the VCE, as demonstrated through the annual VCAA SAC audits. The majority of tasks are still examination-mimicking tasks. This workshop will focus on using a backwards-design process to explore and develop SAC tasks that assess a broader range of skills than is possible to assess through examinations and tests. Participants will be provided with take-away exemplars and SAC planners.

Suitability: VCE Units 1, 2, 3 & 4

A11 Gender Equity in Science Education - Supporting girls to choose physical sciences at high school

Eroia Barone-Nugent & Keith Nugent, University of Melbourne & La Trobe University

Content rich science curricula lack the experiential factors that inspire girls to connect and stay enrolled in the sciences beyond Year 10, and this is especially the case for physics and maths. The pedagogies required to increase the desirability of studying the physical sciences beyond Year 10 are alarmingly few. We will outline a tried tested and successful pedagogical framework to empower teachers and curriculum leaders to inspire girls to remain enrolled in science and especially physics and mathematics. This session will outline a school partnership framework, provide curriculum documents and workshop the application to specific school scenarios and requirements.

Suitability: Years 7 - 10; VCE Units 1, 2, 3 & 4

A12 Life Beyond the Solar System?

Robert Hollows, CSIRO Astronomy and Space Science

The CSIRO Parkes radio telescope is a key facility in the Breakthrough Listen. This is the largest and most sensitive search yet for extra-terrestrial intelligence (ETI) conducted to date and involves telescopes in both hemispheres. In this session we discuss the techniques used to detect exoplanets and the conditions necessary for life on these planets. We focus on the search for ETI with emphasis on radio astronomy techniques, using the Parkes dish as the example and discuss the potential scientific returns and latest results from Breakthrough Listen. This session covers the material and teaching resources for the Option 2.2.

Repeated in C9

Suitability: Years 7 - 10; VCE Unit 2

A13 Science at La Trobe

Catherine Trivett, La Trobe University

An overview of La Trobe's science degrees..

Repeated in C13

Suitability: All

A14 Using Wolfram tools to advance exploration in Physics

Craig Bauling, Wolfram Research

For over 25 years, Wolfram Research has been serving Educators. In the past 5 years, we have introduced many award winning technology innovations like Wolfram|Alpha Pro, Wolfram SystemModeler, Wolfram Programming Lab, and Natural Language computation. Victoria schools have all these tools available to teachers and students for free. Join Craig Bauling as he guides us through the capabilities of these tools in Physics. Craig will demonstrate the key features that are directly applicable for use in teaching, assessment and student projects. Topics of this technical talk include

* Natural Language Input (http// www.wolfram.com/broadcast/screencasts/free - form - input/)
* Market Leading Statistical Analysis Functionality
* Creating interactive models that encourage student participation and learning
* Practical applications in Engineering, Physics, and Mathematics
* On - demand Knowledgebase data and using it to explore Physics

Repeated in B14

Suitability: ALL

A15 HOW "GREEN" IS A LEAF?

Sian Fitzpatrick, Agriculture Victoria

Come and tour Agriculture Victoria's new Plant Phenomics Glasshouse - a facility that enables Scientists to capture three-dimensional images of a plant. This state of the art facility uses high throughput imaging techniques. Explore how plant geneticists individually track plants to capture data on height, colour, water use efficiency, plant architecture, morphology and biomass accumulation. This is a state of the art imaging facility that can complete imaging for 1520 plants in 6.5 hours. Teachers will have access to data sources that can be analysed by students in class. This could be especially useful for Unit 1.

Suitability: ALL

A16 Education Perfect - Empowering and promoting self-regulated learning

Kelly Hollis, Education Perfect

Formative assessment is specifically intended to generate feedback on performance to improve and accelerate learning, and is a process to help instructors understand and improve their students' day-to-day learning and through appropriate interventions. Education Perfect presents a platform that allows students to gain an understanding of topics through rich images and video, and provides feedback for teachers to inform ongoing teaching and learning. This session is a demonstration that shows how Education Perfect allows teachers to locate, assign and customise Australian Curriculum-aligned content, set tasks, build assessments and track student progress. This can inform teachers on their teaching, assessment and reporting cycle of the differentiated classroom.

Delegates Note: Please bring your own laptop

Repeated in B16 & C16

Suitability: Years 7 - 10

A17 Helping students learn better, and teachers teach better

George Triafylos & Tammi Apostolidis, Studyclix Australia

Working with the best teachers in Victoria Studyclix has been able to divide past VCE exam papers in all the main subjects into topics. For each topic you will find past exam questions, exam reports as well as everything you need to improve your exam performance.

Studyclix is completely free for teachers and students will always have free access to any resources uploaded by teachers. Our site is the most innovative learning tool in Australia, and maximises studying efficiency immensely.

Repeated in C17

Suitability: VCE Units 3 & 4

A18 Practical demonstrations in thermodynamics

Doug Bail, Cider House ICT Pty Ltd

Thermodynamics presents a great opportunity to engage students in the practical and investigative side of Physics. At first look the theory appears straight forward but monitoring data over time and with the precision electronic measure allows, lets us draw out a deeper understanding while developing students skills in planning dn developing their own investigations.

This session includes suggestions, demonstrations, hints and techniques directly applicable to the classroom.

Suitability: All

Lunch/Displays
12:15pm – 1:15pm

Keynote Address -

Dr Eric Thrane
1:15pm – 2:05pm

Black holes and merging neutron stars: frontiers in gravitational-wave astronomy

Dr Eric Thrane

Data Theme Leader, ARC Centre of Excellence for Gravitational Wave Discovery (OzGrav), Monash University

The 2017 Nobel Prize in Physics was awarded to Rai Weiss, Kip Thorne, and Barry Barish "for decisive contributions to the LIGO detector and the observation of gravitational waves", ripples in fabric of spacetime caused by some of the most extreme events in the Universe. The discovery of gravitational waves from merging black holes will be remembered as a watershed moment in physics, offering dramatic confirmation of Einstein's theory of general relativity and opening a new window on the Universe. However, while black hole enthusiasts around the world celebrated this stunning achievement, gravitational-wave astronomers harboured a secret. A new source of gravitational waves had been detected, this time from a pair of ultra-dense neutron stars. Moreover, the merging neutron stars produced an electromagnetic glow, which would be recorded by dozens of telescopes around the world. The results, released in October, 2017, sent the astronomical community into a frenzy. In this talk, I describe the rapidly changing landscape of gravitational-wave astronomy from the perspective of a gravitational-wave astronomer.

Session B
2:15pm – 3:15pm

B1 Practical Investigation: Using Log-books and Rubrics to Scaffold Inquiry

Dino Cevolatti & Stuart Bird, Castlemaine Secondary College

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Repeat of A1

Suitability: VCE Unit 2 & 4

B2 VCE Study Design: Making sense of the mares nest and teaching it well

Neil Champion, Buckley Park College

The VCE Study Design has many design faults, the most notable its lack of proper sequencing. How, then, do you teach a non-sequential study design sequentially, starting in Year 11 and taking account of the educationally suspect VCAA rules about sequencing?

Repeated in C2

Suitability: VCE Units 1, 2, 3 & 4

B3 Designing creative and effective SACs that aren't tests

Jane Coyle, Albert Park College

The study design offers many alternatives for SACs in our year 12 study, but often when we are pushed for time and energy we fall back to using a test or similar. In this session I will present some of the alternatives I have used and examine how we can use understanding by design, UbD (also known as backwards by design as a model to enhance our physics instruction and assessment. The primary goal of UbD is student understanding the ability to make meaning of "big ideas"and transfer their learning. Effective curriculum is planned "backward" from long-term desired results through a three-stage design process (Desired Results, Evidence, Learning Plan). I encourage any attendees to bring any SACs they have created that could be shared with the group.

Repeated in C3

Suitability: VCE Units 3 & 4

B4 Uncertainty, Accuracy and Reliability of results in Year 7 to 10 Science

Terry Tan, Copperfield College & Bronwyn Quint & Jocelyn Smith, Mulluana Secondary College

In Science experiments, students use tools to ascertain the quantity they are working with. At the year 7-11 level, students have worked with issues directly relating to the uncertainties, accuracies and reliabilities in measurement. In this session, strategies and activities would be provided to help students think about how uncertainties, accuracies and reliabilities in the experimental process would be developed to aid students in thinking about these issues in preparation for the year 12 Unit 4 topic.

Repeat of A4

Suitability: Years 7 - 10; VCE Units 1 & 2

B5 Tips and hints for beginning teachers

Colin Hopkins, Retired Teacher

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Delegates Note: Preferable to bring along a device to download resources from a USB stick.

Repeat of A5

Suitability: VCE Units 1, 2, 3 & 4

B6 Practical Activities for Teaching U3 AOS 1 Fields

Barbara McKinnon, Kew High School

Find out how to construct an "electric field compass" using cellotape and many other useful demonstration and experiment ideas for enhancing the teaching of the properties of electric, magnetic and even gravitational fields.

Repeat of A6

Suitability: VCE Unit 3

B7 Shedding Light on Electromagnetic Waves

Spiro Liacos, Cheltenham Secondary College

Whether students are learning about thermodynamics, radioactivity, nuclear physics, astronomy, relativity, light, or a host of other topics, they need to have a good understanding of electromagnetic waves. It is therefore essential that we use the very best resources to teach our students what electromagnetic waves are and how they affect us.

Come along and I will show you the easy-to-use, but extremely effective resources that I use to teach my students everything that they need to know about electromagnetic waves.

Suitability: All

B8 From the turbine to your TV: How can we tell the electricity story with plenty of curriculum links?

Matthew Bourne, Monash University

The objective of this paper is to walk through the stages of power generation and distribution to examine some of the myriad VCE curriculum links that emerge along the way. I would then like to discuss as a group the opportunities and challenges that arise when we work "horizontally" following a real world cycle or process that touches multiple Areas of Study.

Repeated in C8

Suitability: VCE Units 1, 2 & 3

B9 What are Stars?

Robert Hollows, CSIRO Astronomy and Space Science

This session presents on overview of key concepts for the Option 2.1 "What are Stars?". The techniques for measuring stars including spectroscopy and photometry lead into discussion of the properties and classification of stars.

The life cycles of stars are addressed with respect to energy sources and the interplay of forces. We unpack the Hertzsprung-Russell diagram and show what it reveals about stellar evolution. Some current research topics, including Australian examples are included. Useful resources and activities are identified.

Suitability: All

B10 Special Relativity - what worked and what did not?

Theo Hughes, Monash University

Now you have taught it - time to reflect. What did you understand and what did you not? What did your students not get? You'll get a chance to work on some classic problems that can help your understanding, and get answers to any questions you have... possibly ones your students asked you, and you were unable to answer.

Repeated in C10

Suitability: VCE Unit 4

B11 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.

Suitability: VCE Units 1, 2, 3 & 4

B12 If it doesn't work, it's physics

Phil Jones, The Logical Interface

When I first started teaching physics the Magnus Pyke quote " it squirms, it's biology. If it stinks, it's chemistry. If it doesn't work, it's physics" was certainly true of physics. I struggled with the equipment I had available to me and I longed for equipment that would allow me to perform experiments with acceptable results. Today teachers have access to inexpensive equipment which allows them to perform sophisticated experiments which both enthuse and excite their students.

- Data Logging Technology is an extremely powerful data acquisition and analysis tool for Physics.

- PC Based Signal Generator and Oscilloscope.

- Video Analysis of Motion. An exciting way to analyse motion.

- Physics modeling with Interactive Physics.

- Simulation software - Krucible and Yenka are revolutionary software for creating simulations and demonstrating experiments that are impractical in the science lab.

Repeated in C12

Suitability: All

B13 Outreach workshops contextualise student learning

Jessica Kvansakul & Rachel Meredith, La Trobe University

Physics workshops in La Trobe's Outreach Program provide context and background for students. Developed in collaboration with researchers, academics and experienced teachers, the workshops align with the VCE curriculum. Workshop activities provide students with a better understanding of scientific methods and consolidate science inquiry skills, core components of all science studies.

Delegates have the opportunity to explore activities from a number of workshops including Radioactivity (Unit 1, AOS 3), Transmission of Electrical Power (Unit 3, AOS 2), and Photoelectric Effect (Unit 4, AOS 2).

Suitability: VCE Units 1, 2, 3 & 4

B14 Using Wolfram tools to advance exploration in Physics

Craig Bauling, Wolfram Research

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* Creating interactive models that encourage student participation and learning
* Practical applications in Engineering, Physics, and Mathematics
* On - demand Knowledgebase data and using it to explore Physics

Repeat of A14

Suitability: ALL

B15 Getting Smart with kinematics and dynamics

Doug Bail, Cider House ICT Pty Ltd

PASCO's new Smart Cart is proving a game changer in the practical and investigative side of kinematics and dynamics. From STEM activities in Year 7 to studies of motion in avertical circle in Year 12, one clever box of electronics opens up all sorts of possibilities at a fraction of the price of an air track.

Repeated in C14

Suitability: All

B16 Education Perfect - Empowering and promoting self-regulated learning

Kelly Hollis, Education Perfect

Formative assessment is specifically intended to generate feedback on performance to improve and accelerate learning, and is a process to help instructors understand and improve their students' day-to-day learning and through appropriate interventions. Education Perfect presents a platform that allows students to gain an understanding of topics through rich images and video, and provides feedback for teachers to inform ongoing teaching and learning. This session is a demonstration that shows how Education Perfect allows teachers to locate, assign and customise Australian Curriculum-aligned content, set tasks, build assessments and track student progress. This can inform teachers on their teaching, assessment and reporting cycle of the differentiated classroom.

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Repeat of A16 & Repeated in C16

Suitability: Years 7 - 10

B17 Microcontrollers in the Science/Physics Lab

Milorad Cerovac, The King David School

The Arduino, micro:bit, and Raspberry Pi are examples of three inexpensive microcontrollers which provide cheap, easy and effective ways of engaging students with practical activities from Years 7 to 12, whether in the Physics Lab or the General Science Lab. This session will introduce teachers to the Arduino, micro:bit and Raspberry Pi microcontrollers through a series of hands-on activities (including programming) that will cover experiments in Renewable Energy, Thermodynamics, Sound, Motion and Electronics.

Repeated in C15

Suitability: Yrs 7-10, VCE Units 1-4

Afternoon Tea/Displays
3:15pm – 3:40pm

Session C
3:45pm – 4:45pm

C1 Model Rocketry in the Classroom

Peter Razos, Trinity Grammar School

"Now that Australia has geared up to be a player in space exploration the interest in physics through space and rocketry should be running high. Talk of further Moon exploration and having a colony on Mars further fuel the interest in the physics behind rocketry as a means to transport hardware and humans. Come and experience how model rocketry can be part of an exciting science curriculum activity. All participants will be encouraged to build and launch their own model rocket. We will also explore ways of incorporating this exciting activity into the junior science curriculum to explore energy conversion, acceleration and forces."

Suitability: All

C2 VCE Study Design: Making sense of the mares nest and teaching it well

Neil Champion, Buckley Park College

The VCE Study Design has many design faults, the most notable its lack of proper sequencing. How, then, do you teach a non-sequential study design sequentially, starting in Year 11 and taking account of the educationally suspect VCAA rules about sequencing?

Repeat of B2

Suitability: VCE Units 1, 2, 3 & 4

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Jane Coyle, Albert Park College

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Repeat of B3

Suitability: VCE Units 3 & 4

C4 Teaching for conceptual understanding – what we can learn from the Modeling Instruction movement.

Barbara McKinnon, Kew High School

The new Victorian and Australian curricula both place considerable emphasis on the role of models in student conceptual understanding. In the USA, the "Modeling Instruction" pedagogy initially developed by Professor David Hestenes at Arizona State University in collaboration with high school physics teacher Malcolm Wells has enjoyed great success. "Modeling Instruction" was initially about addressing well-known student difficulties with conceptual understanding of kinematics and dynamics. It has now blossomed into a large movement incorporating chemistry, biology and earth science as well as middle school science. It is an inspiring physics education research story, which has led to a remarkable professional development program, providing workshops for more than 4000 teachers since 1990, and more recently to the establishment of the not-for-profit American Modeling Teachers' Association, a network of more than 1000 teachers. Barbara McKinnon will speak about her experience attending two of the American Modeling Teachers' Association workshops and the important lessons for the teaching of science in schools in Australia.

Suitability: All

C5 How to make a working model of a DC motor & EPI related with sound topic

Gracie Saxena, Manor Lakes P 12 College

Suitable for VCE Physics, Unit 3, How are fields used to move electrical energy?

AIM - To build a working model of Electric Motor and develop understanding re

* Various components of a simple DC motor
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Repeat of A9

Suitability: VCE Units 3 & 4

C6 Designing VCE Assessment Tasks That Are Not Just Examination Mimics

Maria James, VCAA

Although schools are increasingly turning their attention in upper primary and lower secondary years to teaching and assessing what is variously termed as capabilities, enterprise skills, 21st century skills and/or future work skills, such attention is not reflected in the selection of School-assessed Coursework (SAC) tasks in the VCE, as demonstrated through the annual VCAA SAC audits. The majority of tasks are still examination-mimicking tasks. This workshop will focus on using a backwards-design process to explore and develop SAC tasks that assess a broader range of skills than is possible to assess through examinations and tests. Participants will be provided with take-away exemplars and SAC planners.

Suitability: VCE Units 1, 2, 3 & 4

C7 Taking a closer look at Option 2.9 of Unit 2: How Can Human Vision Be Enhanced?

Spiro Liacos, Cheltenham Secondary College

The eye! It's one of the most fascinating things in the universe and it provides us with a fantastic opportunity to teach some amazing Physics. This session will provide you with resources and practical activities that will allow you to teach Option 2.9 of Unit 2 really easily. (Much of the content in Option 2.9 also forms part of Unit 4.) You will even be able to flip the classroom to allow your students to teach themselves.

The session will cover reflection, refraction, lenses, how our eyes produce images, accommodation, spectacles, and a whole lot more!

Suitability: Years 7 - 10; VCE Unit 2 & 4

C8 From the turbine to your TV: How can we tell the electricity story with plenty of curriculum links?

Matthew Bourne, Monash University

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Repeat of B8

Suitability: VCE Units 1, 2 & 3

C9 Life Beyond the Solar System?

Robert Hollows, CSIRO Astronomy and Space Science

The CSIRO Parkes radio telescope is a key facility in the Breakthrough Listen. This is the largest and most sensitive search yet for extra-terrestrial intelligence (ETI) conducted to date and involves telescopes in both hemispheres. In this session we discuss the techniques used to detect exoplanets and the conditions necessary for life on these planets. We focus on the search for ETI with emphasis on radio astronomy techniques, using the Parkes dish as the example and discuss the potential scientific returns and latest results from Breakthrough Listen. This session covers the material and teaching resources for the Option 2.2.

Repeat of A12

Suitability: Years 7 - 10; VCE Unit 2

C10 Special Relativity - what worked and what did not?

Theo Hughes, Monash University

Now you have taught it - time to reflect. What did you understand and what did you not? What did your students not get? You'll get a chance to work on some classic problems that can help your understanding, and get answers to any questions you have... possibly ones your students asked you, and you were unable to answer.

Repeat of B10

Suitability: VCE Unit 4

C11 Access new horizons through the Quantum Victoria Online Learning Portal

Joel Willis & Latha Shivasubramanian, Quantum Victoria

Quantum Victoria has developed an Online Portal where students and teachers can access engaging programs that educate and inspire anytime, anywhere. Teachers will be able to observe students' growth throughout the robust programs, and provide their students with the necessary scaffolding that deepens their discipline knowledge.

Quantum Victorias Online Portal offers a blended approach to learning and will include

- VCE Revision Lectures
- Cyber security Programs
- Extension activities complementing Quantum Victoria's onsite programs

Quantum Victoria is a Centre of Excellence and Innovation in STEM Education. Join our presenters and discover how our exciting new Online Portal can enhance your teaching and learning beyond the classroom.

Suitability: All

C12 If it doesn't work, it's physics

Phil Jones, The Logical Interface

When I first started teaching physics the Magnus Pyke quote "If it squirms, it's biology. If it stinks, it's chemistry. If it doesn't work, it's physics" was certainly true of physics. I struggled with the equipment I had available to me and I longed for equipment that would allow me to perform experiments with acceptable results. Today teachers have access to inexpensive equipment which allows them to perform sophisticated experiments which both enthuse and excite their students.

- Data Logging Technology is an extremely powerful data acquisition and analysis tool for physics.
- PC Based Signal Generator and Oscilloscope.
- Video Analysis of Motion. An exciting way to analyse motion.
- Physics modeling with Interactive Physics.
- Simulation software - Krucible and Yenka are revolutionary software for creating simulations and demonstrating experiments that are impractical in the science lab.

Repeat of B12

Suitability: All

C13 Science at La Trobe

Catherine Trivett, La Trobe University

An overview of La Trobe's science degrees.

Repeat of A13

Suitability: All

C14 Getting Smart with kinematics and dynamics.

Doug Bail, Cider House ICT Pty Ltd

PASCO's new Smart Cart is proving a game changer in the practical and investigative side of kinematics and dynamics. From STEM activities in Year 7 to studies of motion in avertical circle in Year 12, one clever box of electronics opens up all sorts of possibilities at a fraction of the price of an air track.

Repeat of B15

Suitability: All

C15 Microcontrollers in the Science/Physics Lab

Milorad Cerovac, The King David School

The Arduino, micro:bit, and Raspberry Pi are examples of three inexpensive microcontrollers which provide cheap, easy and effective ways of engaging students with practical activities from Years 7 to 12, whether in the Physics Lab or the General Science Lab. This session will introduce teachers to the Arduino, micro:bit and Raspberry Pi microcontrollers through a series of hands-on activities (including programming) that will cover experiments in Renewable Energy, Thermodynamics, Sound, Motion and Electronics.

Repeat of B17

Suitability: Yrs 7-10, VCE Units 1-4

C16 Education Perfect - Empowering and promoting self-regulated learning

Kelly Hollis, Education Perfect

Formative assessment is specifically intended to generate feedback on performance to improve and accelerate learning, and is a process to help instructors understand and improve their students' day-to-day learning and through appropriate interventions. Education Perfect presents a platform that allows students to gain an understanding of topics through rich images and video, and provides feedback for teachers to inform ongoing teaching and learning. This session is a demonstration that shows how Education Perfect allows teachers to locate, assign and customise Australian Curriculum-aligned content, set tasks, build assessments and track student progress. This can inform teachers on their teaching, assessment and reporting cycle of the differentiated classroom.

Delegates Note: Please bring your own laptop

Repeat of A16 & B16

Suitability: Years 7 – 10

C17 Helping students learn better, and teachers teach better

George Triafylos & Tammi Apostolidis, Studyclix Australia

Working with the best teachers in Victoria Studyclix has been able to divide past VCE exam papers in all the main subjects into topics. For each topic you will find past exam questions, exam reports as well as everything you need to improve your exam performance.

Studyclix is completely free for teachers and students will always have free access to any resources uploaded by teachers. Our site is the most innovative learning tool in Australia, and maximises studying efficiency immensely.

Repeat of A17

Suitability: VCE Units 3 & 4

Meet'n Greet
4:45pm – 5:30pm

Saturday Excursion Taster and Medical Physics In-Service

9:00am

D1 Australian Synchrotron

(1 hour) Clayton

(http://www.synchrotron.org.au/)

Participants will have a guided tour of the facility as well as an opportunity to see the range of practical activities that are available for secondary students to do as part of an excursion. Location: Blackburn Rd, Clayton.

11:00am

E1 Medical Physics In-Service at Peter MacCallum Cancer Centre

(2 hours) East Melbourne

The program will feature a one-hour talk on:

- the physics aspects of the effect of radiation on the human body and of the medical technology at Peter Mac,
- how the technology is used in diagnosis and treatment, as well as
- information on the training and career paths associated with medical physics.

The second hour will be an extensive tour of the facilities at Peter Mac.

2:00pm

F1 Victorian Space Science Education Centre (VSSEC)

(90 min) Strathmore

(http://www.vssec.vic.edu.au/)

The tour explains the various student programs that VSSEC offers. Their programs provide a sensory rich, hands-on, scenario-based science experience for students from primary to senior secondary. There are also programs on Astronomy (co-ordinate systems, solar system and telescopes) and Astrophysics (models of the nature and origin of the Universe, and the life cycle of stars)

Science Teachers' Association of Victoria Inc.
ABN 59 004 145 329

Science Victoria
ABN 94 108 759 762

OFFICE USE ONLY
Registration Number

VCE Conferences 2018 **Registration Form**

Register online at: www.sciencevictoria.com.au/conferences.html
Please note registration will not be processed if a school purchase order is not supplied

Personal Details

School Purchase Order No. _____ STAV Individual Membership No. _____

Title: First name: Surname:

School/Organisation:

Email Address (all correspondence by email)

Address:

Suburb: State: Postcode:

Telephone: Mobile:

School Type: ☐ Government ☐ Independent ☐ Catholic ☐ Other

Region: ☐ North-Eastern ☐ North-Western ☐ South-Eastern ☐ South-Western Victoria

School Level: ☐ Early Years (F-4) ☐ Middle Years (5-8) ☐ Later Years (9 - 10) ☐ VCE

Gender: Male/Female Dietary requirements call STAV directly on 03 9385 3999

Privacy Statement:
You may be contacted from time to time with information regarding upcoming events.

I wish to attend: (Please ensure you fill out a **SEPARATE** Registration form for each VCE Conference you wish to attend)

☐ **VCE Chemistry**	Tuesday 13 February 2018 at La Trobe University, Bundoora
☐ **VCE Biology**	Wednesday 14 February 2018 at La Trobe University, Bundoora
☐ **VCE Physics**	Friday 16 February 2018 at La Trobe University, Bundoora

Workshops: Session Selection

*There is a limit to the number of participants in many sessions. Sessions will be allocated on a 'first come, first served' basis.
*You will be notified by **email** of the sessions to which you have been allocated prior to the conference.
*Register as early as possible to ensure your choice of sessions.
***Session codes must be used, eg. A1, B1, C1**

Preferences		1st	2nd	3rd	4th
Session A	1				
Session B	2				
Session C	3				

Biology Only

Session D	1st	2nd	3rd	4th

Physics Only - Saturday 17 February Excursion

- ☐ **D1** 9am - Australian Synchrotron
- ☐ **E1** 11am - Medical Physics in Service, Peter Mac
- ☐ **F1** 2pm - Victorian Space Science Centre

Please complete details overleaf>>

VCE Conferences 2018 **Registration Form**

Name: _____

Meet'n Mingle

☐ **Chemistry** - Will you be attending the "Meet'n Mingle" session? Please tick. (for catering purposes)

☐ **Biology** - Will you be attending the "Meet'n Mingle" session? Please tick. (for catering purposes)

☐ **Physics** - Will you be attending the "Meet'n Mingle" session? Please tick. (for catering purposes)

VCE Chemistry, Biology and Physics Conferences

☐ STAV Individual member - **$180 per conference**

☐ CEA Member (for Chemistry conference **only**) - **$180 per conference**

☐ STAV School Subscriber - **$296 per conference**

☐ Non-STAV member - **$322 per conference**

☐ Retired Teacher - **$78 per conference**

☐ Full Time Student (Must provide **student id** to receive concession rate) - **$78 per conference**

☐ Presenter - FREE

Registration includes

Conference sessions, breakfast for Chemistry and Biology and morning tea for Physics and lunch for all conferences.
All prices quoted are GST inclusive. A tax invoice will be issued.

Payment details ABN 94 108 759 762 **TAX INVOICE**

☐ Cheque - make payable to: **SCIENCE VICTORIA** ☐ Invoice School/Purchase order supplied

☐ Credit Card *(Please tick applicable)* ☐ VISA ☐ MasterCard

Card No. ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ Expiry Date ☐☐/☐☐ CCV No. ☐☐☐

Name of Cardholder (please print) Signature

<u>Cancellation policy:</u> A 50% cancellation fee will apply.
Notification of cancellation <u>must be in writing</u>.
There will not be any refund for cancellations made less than 2 weeks prior to the conference.

CLOSING DATE for all Registrations is 5 business days prior to each conference

EMAIL: stav@stav.vic.edu.au • FAX: 9386 6722