

UNE GRASS / 2019

Teacher Professional Development



Welcome to the 2019 UNE GRASS Teacher Professional Development Event

Sessions included in our program are designed to support the content from the secondary science and agriculture syllabus.

Our program provides professional development support for secondary science education and agricultural science. Presenting smart science, smart living and the science feeding the world and saving the planet.

Presentations included in this event are offered by internationally recognised scientists outlining topical and cutting edge science, and key leaders in secondary science and agricultural science education.



une
University of
New England

GRASS
Growing Regional
and Agricultural
Students in Science



Monday 2 December

UNE GRASS 2019 / Teacher PD event



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TIME	WHAT	WHO	WHERE
8.00am – 8.15am	Registration	UNE GRASS Team	Ground floor labs, Agronomy & Soil Science (AGSS) (W23)
8.30am – 8.40am	Welcome to Country and Official welcome to UNE	Ms Leslie Widders & Mr Frank Leayr, UNE	EM 1 Lecture theatre, Ecosystem Management building (W55)
8.40am – 10.00am	Key Note Presentation Developing expertise in scientific practice	Dr Sham Nair, NSW Department of Education	EM 1 Lecture theatre, Ecosystem Management building (W55)
10.00am – 10.30am	MORNING TEA		Central courtyard, Ecosystem Management building (W55)
10.30am – 10.45am	Opportunities for students & teachers through the UNE Growing Regional & Agricultural Students in Science (GRASS) program	Ms Susanna Greig with UNE GRASS team	EM 1 Lecture Theatre, Ecosystem Management building (W55)
10.45am – 10.55am	Update on HSC booster event	Mrs Sally Strelitz/Ms Briony Looker	EM 1 Lecture Theatre, Ecosystem Management building (W55)
10.55am – 11.10am	Travel to UNE SMART Farm Innovation Centre		
11.10am – 12.40pm	Update and insight to the UNE SMART FARMS opportunity	Ms Susanna Greig, Ms Elizabeth Argue & Mr Derek Schneider	UNE SMART Farm Innovation Centre, Kirby rural property
12.40pm – 1:15pm	LUNCH		UNE SMART Farm Innovation Centre, Kirby rural property
1.20pm – 1.50pm	Travel to UNE		
1.50pm – 4.00pm	Stage 6 Concurrent workshops		
	Chemistry: Quantitative analysis and analysis of organic substances	Dr. Peter Lye & Dr. Michelle Taylor (UNE)	East Wing, Stokes building (C24) and Seminar Room 3.07, Riggs building (C23)
	Biology: Changing genes in a changing world: gene technology and biotechnology	Dr. Mary McMillian	Biological Sciences Lab, Biological Sciences building (S03) Lab 4, McClymont (W34)
	Physics: Gigabytes of Physics	Dr. Peter Fletcher, Mr. Ron Bradbury, Dr. Steve Bosi and Dr. Robert Whannell, UNE	West Wing Stokes building (C24) and Photonics lab Stokes building (C24_G29)
	Earth & Environmental Science: An industry prospective - Climate Change & Renewable Energy Production	Mr Adam Blakester and Mr Ben Wynn	Lab 1, McClymont (W34) (W34)
4.05pm – 4.30pm	Agriculture: Developing the cow or sheep of the future	Dr. Peter McGilchrist & Dr Sam Clark	Wright Lecture Theatre (W48_WLT) and Ground floor labs, Agronomy & Soil Science (AGSS) (W23 1.27 & 1.28)
	Research insight: Agricultural tech and teaching industry ready students	Dr. Oliver Knox, UNE	EM 1 Lecture theatre in Ecosystem Management building (W55)
4.30pm – 6.00pm	Sharing and networking opportunity for teachers (Optional)		The Bistro, UNE
6.00pm for 6:30pm	UNE GRASS TEACHER PD EVENING DINNER FUNCTION Guest speaker, Mary McMillian, UNE "Living and Learning in Antarctica."		The Bistro, UNE

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Dr. Sham Noir (NSW Education)	<p>Key Note Presentation: Developing expertise in scientific practice</p> <p>This presentation is an interactive session that focuses on identifying elements that promote deep learning in science. Teachers will be provided with evidence-based best practices for developing inquiry skills and strategies for assessing those skills. These approaches will be suitable for all inquiry-based learning activities that are described in the new Stage 6 science syllabuses (e.g. Depth Studies and Research Projects). We will examine how inquiry and direct-instruction pedagogies may be combined for effective instruction. Furthermore, we will explore how these ideas may be incorporated into the junior science curriculum so that students are better prepared for instruction in the Stage 6 sciences.</p>
UNE GRASS Susanna Greig and GRASS students	Susanna with the GRASS team will outline the opportunities for school students and teachers through the UNE GRASS program, what's still planned for the 2019-20 phase along with what's planned for the next phase of the program.
UNE SMART Farms Susanna Greig, Derek Schneider and Elizabeth Argue	<p>The UNE SMART Farms are valuable resources that enable UNE researchers and their industry and community partners to conduct world-class activities that encompass Sustainable, Manageable, Accessible, Rural Technologies (SMART). Supporting a range of disciplines including natural and agricultural ecosystems, poultry, livestock and canine sciences, precision agriculture and zoology, the SMART Farms offer researchers and postgraduates the space, environment and facilities to work and partner with industry to solve real-world problems. The SMART Farms also provide the context for problem-based experiential learning for undergraduates and for school educational activities.</p> <p>In this session, Susanna Greig, Elizabeth Argue and Derek Schneider will outline the opportunity for school visits and activities exposing students to the technologies in agriculture, the connected UNE SMART Farms, and the plans for development of a data telemetry bus, allowing live data to be shared with industry, schools and researchers.</p>
LUNCH	
Dr. Peter Lye & Dr. Michelle Taylor (UNE)	<p>Chemistry-Quantitative analysis and analysis of organic substances</p> <p>This session will enable you to complete an activity exploring two key areas of the NESA HSC syllabus, as detailed below.</p> <p>Quantitative Analysis: You will standardise a strong base, and then use the standardised base solution to perform a pH titration to determine the K_a of a weak acid. After determining the pK_a of the weak acid you will decide where the acid fits in a series of weak acids based on its strength. Finally, you will design an experiment to prepare a buffer solution and demonstrate its properties. Module 6: Acid/base Reactions</p> <p>Analysis of Organic Substances: You will identify and determine the structure of some simple organic compounds using data from techniques such as nuclear magnetic resonance spectroscopy (NMR), mass spectroscopy and infrared spectroscopy while working through problems and playing games. Module 8: Applying Chemical Ideas.</p>

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Dr. Mary McMillian (UNE)	<p>Biology – Changing genes in a changing world: gene technology and biotechnology</p> <p>The more that we understand about the structure and function of DNA, the more we can manipulate it for our own advantage. This session is closely aligned with Module 6 of the year 12 NESA Biology syllabus and will allow participants to explore different applications of biotechnology, and the potential benefits these technologies can have for society. Case studies will be used to demonstrate how genetic change can be induced using current genetic technologies, and participants can gain first-hand experience in the techniques used to create recombinant DNA and clone genes. Participants will also discuss how students can plan and carry out investigations on the use of biotechnology and the social and ethical implications that arise.</p> <p>Module 6: Genetic Change</p>
Dr. Peter Fletcher, Mr. Ron Bradbury, Dr. Steve Bosi and Dr. Robert Whannell, (UNE)	<p>Physics – Gigabytes of Physics</p> <p>This workshop will provide 2 valuable insights:</p> <p>We will carry out three kinematic experiments - using video to capture the motion - and quantify that motion using Tracker. Tracker is a video motion analysis application. It is free and designed to be used in physics education. Students will learn kinematics, experimental methods and IT skills. Aligned with Module 1: Kinematics; Module 2: Dynamics; & Module 5: Advanced Mechanics.</p> <p>We will use RSpec software which enables spectral analysis of stars, nebulae and planets. The setting up of a telescope and DSLR using a Star Analyser grating will be demonstrated. We will investigate how the spectra of stars, nebulae, planets and galaxies can provide information on surface temperature, rotational velocity, translational velocity and chemical composition.</p> <p>Aligned with Module 7: The Nature of Light & Module 8: From the Universe to the Atom</p>
Mr. Adam Blakester, Mr Ben Wynn	<p>Earth & Environmental Science – An industry prospective – Climate Change & Renewable Energy Production</p> <p>Climate change is likely to be the greatest challenge facing the next gen in schools today. This workshop will present the Global climate change, outline the current and future opportunities for building sustainable futures and set the scene for the renewable energy industry in Australia and globally.</p> <p>The Wynergy business model will be shared as a case study using renewable solar energy and offering an exciting solution for sustainable energy production. Teachers will be supported to extend this insight and industry information into their classroom teaching. Module 7: Climate Science & Module 8: Resource Management.</p>
Dr. Peter McGilchrist & Dr Sam Clark (UNE)	<p>Agriculture – Developing the cow or sheep of the future</p> <p>With ever increasing climatic variability and changing requirements of the modern consumer – what package of genes does the cow or ewe of the future require to meet production requirements and consumer demands? This session will gaze into the future about the breeding and consumption of beef cattle and sheep covering genetic selection tools, rising importance of genomic information, measurement of hard to measure meat traits using technologies and value adding techniques to enhance carcass value. You will get to taste test some delicious beef and lamb to see if you can spot the difference in quality or how it is prepared! With real opportunities for linkages to Stage 4, 5 & 6 Agriculture</p>

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<p>Dr. Oliver Knox (UNE)</p>	<p>Research insight – Agricultural tech and teaching industry ready students</p> <p>Whilst grain prices have moved very little in the last 30 years on, farm technology is moving fast. From soil surveys, to weed control, irrigation application, crop monitoring and harvest information the wealth of data on our farms is amazing. As well as the data there are advances in vehicle automation, which in itself has the potential to revolutionise not only farming, but the downstream processing of our agricultural commodities. However, the potential advances from this data and automation will only be recognised if we are developing an agricultural workforce that knows how to interrogate and use it. It then becomes our responsibility to make sure we produce students capable of undertaking the augmented agricultural positions of the future. Using cotton as an example Oliver will provide some insights into what is happening and where he feels we can deliver the tools of the future in the classroom.</p>
<p>Dr. Mary McMillian (UNE)</p>	<p>6 for 6.30pm Evening dinner function presentation</p> <p>Living and Learning in Antarctica.</p> <p>Our guest speaker, Dr. Mary McMillan will share her inspiring Homeward Bound experience, which was a ground-breaking leadership initiative for women in STEM, set against the backdrop of Antarctica, and aims to heighten the influence and impact of women in making decisions that shape our planet. In 2019 Mary (Lecturer in Biomedical Science), joined 80 women from around the globe to work on developing leadership skills, strategic planning, increasing visibility of women in STEM and forged collaborations, while exploring the sights and sounds of Antarctica. In this presentation Mary will speak about the Antarctic experience, while sharing images of the Antarctic landscape and some of the leadership lessons learnt. This presentation will share lessons in leadership and driving change.</p>





Tuesday 3 December

UNE GRASS 2019 / Teacher PD event



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TIME	WHAT	WHO	WHERE
8.00am – 8.15am	Registration	UNE GRASS Team	Ground Floor labs, Agronomy & Soil Science (AGSS) (W23_1.27 & 1.28)
8.20am – 10.25am	CONCURRENT ENQUIRY INSIGHTS		
	UNE Discovery	Discovery team lead by Dr. Kirsti Abbott	Biological Sciences Lab (So3) Lewis Lecture Theatre (C28_C1)
	Getting down and dirty with soil tech	Mr. Martin Levins (ACARA)	Economics, Business & Law Red PC Lab (W42_2.18)
	Google Drawings	Biology Dept, NEGS	Economics, Business & Law Blue PC Lab (W42_2.19)
10.30am – 11.00am	MORNING TEA		Central courtyard in Ecosystem Management building (W55)
11.00am – 11.30am	Value-adding in science education	Dr. Sham Noir (Education NSW)	Lewis Lecture Theatre (C28_C1)
11.30am – 12.30pm	The secondary–tertiary education nexus – preparing students for success at university	Dr. Janelle Wilkes (UNE) leading the Australian University AgEd Symposium	EM 1 Lecture theatre in Ecosystem Management building (W55)
12.30pm – 1:10pm	LUNCH AND COLLECTION OF EVALUATION		
1.10pm – 2.45pm	Concurrent Depth Study, Extension Science and Agriculture workshops		
	Chemistry	Chair Luke Andrews, (Uralla Central School)	Agricultural Education bld, Collaborative learning room (W77_120.1)
	Biology	Chair Belinda Stone (NEGS) & Yvette Ballard (PLC)	Biological Sciences Lab (So3)
	Physics	Chair Ms. Suzie Feodoroff (St Mary's College)	Tutorial room in Ecosystem Management building (W55_2.273)
	Earth & Environmental Science	Chair Mrs. Mel Waters (Nambucca Heads High School)	Agricultural Education building, Museum tutorial room (W77_120.2)
	Investigating Science	Chair Ms. Joanne Garland (Willyama High School)	Homestead Seminar room (W47_1.34)
	Extension Science	Chair Mrs. Lilly Moar (O'Connor Catholic College) with Dr. Sham Noir	PBL meeting room 2nd floor, Agronomy & Soil Science building (W23)
	Agriculture	Chair Mr. Mark Fisher (NEGS)	CJ Hawkins Board room, Homestead building (W47_1.47)
2:45pm	COMPULSORY NESA SIGN OFF		
3:00pm	CLOSE OF EVENT		

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Discovery team lead by Kirsti Abbott (UNE)	<p>UNE Discovery</p> <p>During the primary school years brains are laying down the foundations, and building brain architecture for life. It is during this time when it takes very little energy to learn, and the brain's ability to change and learn is immense. As children move into high school, self-motivated unstructured play continues to contribute to the cognitive, behavioral, social and emotional development of their brains. To help transition your students to independent problem-solving and critical thinking as they develop as teenagers, we'll explore playful ways of setting up a physical space as a "science classroom" that encourages students to engage with unfamiliar tasks and concepts. You'll get to set up your own experimental bench, try other ideas out, and think playfully about learning across Science, Technology, Engineering, Arts and Maths.</p>
Mr. Martin Levins (ACARA)	<p>Getting down and dirty with soil tech</p> <p>Increasingly, technology affects education, offering opportunities for deep learning and engagement that have not been possible before. In this workshop, we'll build and calibrate a soil moisture sensor, and use the values it returns so a micro-controller can turn on a pump or a tap. We'll look at the solutions it provides and the opportunities it raises for the teaching of Agriculture and of Science. No previous experience will be assumed and all equipment will be provided on the day.</p>
Biology Dept, NEGS	<p>Google Drawings</p> <p>Participants in this session will learn how to set up Google Drawings for different projects, setting up hyperlinks, creating transparent shapes to create hyperlinks and setting up hyperlinks from material in Google Drive. This session should provide many ideas for different curriculum projects so that participants can create relevant and engaging projects for their students.</p>
Dr. Sham Noir (Education NSW)	<p>Value-adding in science education</p> <p>In this session, Sham will discuss how to teach those areas of science that do not form a part of normal science instruction, including the history and philosophy of science, research ethics and public understanding of science.</p>
Dr. Janelle Wilkes (UNE) leading the Australian University AgEd Symposium	<p>The secondary – tertiary education nexus – preparing students for success at university</p> <p>Secondary school teachers and lecturers can learn from each other to ensure that students succeed in transitioning to university. This session will feature a panel discussion highlighting the most important issues affecting student success in university agriculture courses. As the GRASS Teacher PD event and the Australian University AgEd Symposium coincide at UNE this year, this session will enable a two-way conversation and allow each group to learn from each other. Panellists from both secondary and tertiary education will address the barriers and opportunities for secondary school students transitioning to tertiary education in agriculture-related disciplines; interstate differences in prerequisites and assumed knowledge; student preparedness in mathematics, chemistry and English; alternative pathways to university study, and how universities can better communicate their expectations of freshers to high school students. There will also be time for a brief Q&A session for delegates to pose questions to the panel, prior to a joint lunch.</p>

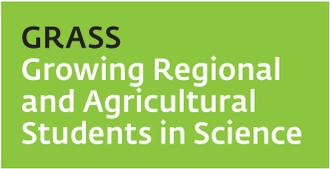
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<p>Luke Andrews (Uralla Central School)</p> <p>Yvette Ballard (PLC)</p> <p>Ms. Suzie Feodoroff (St Mary's College)</p> <p>Ms. Mel Waters (Nambucca Heads High School)</p> <p>Ms. Joanne Garland (Willyama High School)</p> <p>Mrs. Lilly Moar (O'Connor Catholic College)</p> <p>Chair Mr. Mark Fisher (NEGS)</p>	<p>Concurrent Depth Study Workshops:</p> <p>Chemistry: Chair Luke Andrews, (Uralla Central School); Biology: Chair NEGS Biology Dept & Yvette Ballard (PLC); Physics: Chair Ms. Suzie Feodoroff (St Mary's College) Earth & Environmental Science Chair Ms. Mel Waters (Nambucca Heads High School); Investigating Science: Chair Ms. Joanne Garland (Willyama High School)</p> <p>Depth Studies have now been implemented and assessed. This workshop is an opportunity for teachers to work with others teaching their science course to share and compare strategies to support students understanding, embracing and demonstrating high level Working Scientifically Skills in preparation for and while completing Depth Study projects.</p> <p>Extension Science Workshop: Chair Mrs. Lilly Moar (O'Connor Catholic College)</p> <p>The Extension Science course immerses students into the rigour and process of scientific research. The key to student success is in supporting students at each step in the process.</p> <p>In this workshop, teachers will have an opportunity to share the teaching strategies they have taken in supporting students embrace each stage and process of science research. Teachers will also have the opportunity to share and further develop rubrics / timelines for supporting students to develop skills at each stage of the process of completing a scientific research project.</p> <p>Agriculture Workshop: Chair Mr. Mark Fisher (NEGS)</p> <p>In this workshop, teachers will have an opportunity to share teaching strategies, which work well and are effective in the delivery of the HSC agriculture course. Furthermore, in response to the release of the stage 5 agriculture course to be implemented in 2020, teachers will have the opportunity to share and compare the changes and plans in place for the teaching of stage 4&5 agriculture in response to the new requirements for implementation.</p>



The UNE GRASS program acknowledges the support from our valued supporters making this scholarship experience possible:



Armidale Central Rotary Club

