**Sunday 26th June – Session Descriptions** (note: *sessions - streamed to regional centres/recorded)

| **Concurrent Workshops 4 (55min)** |
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| **Activating Tech in Methods**<br>*Heather Meinecke (Teacher, St Joseph's College) (Curriculum)*<br><br>With the introduction of External Assessment and the transition from the Mathematics B (2014) syllabus to the (roughly equivalent) Mathematical Methods (2019) syllabus, many teachers have needed to reflect upon and update their classroom practice. A particularly important area for reflection is the use of technology in both the classroom and in assessment settings. The Mathematics B syllabus explicitly mentioned technology in only one of the seven key competencies listed for the criterion of *Knowledge and Procedures* and not at all in the other criteria of *Modelling and Problem Solving* and *Communication and Justification*. Now in Mathematical Methods, the use of technology has become much more prominent in the assessment process, with many of the questions in the Technology Active papers either being greatly simplified by, or actually requiring, the use of complex features of the Graphing Calculator. Whereas in Mathematics B, the syllabus maintained that 'student ownership of graphing calculators is not a requirement' it would be an unthinkable disadvantage to a student in Mathematical Methods to not have their own Graphing Calculator. However, the observation of external markers in Methods is that many students are continuing to choose algebraic approaches over technology-enabled processes in Paper 2. Teachers are challenged to provide classroom experiences that equip students to obtain solutions both with and without technology, encouraging students to select a technology active approach in Paper 2 unless the wording of questions explicitly directs otherwise.<br><br>Heather came late to teaching, after obtaining an Honour Degree in Mathematics and working as a Quantitative Researcher, considering financial markets in Australia and overseas, and being a full time Mum for 10 years. She has the good fortune to work with many students who have a desire to wrestle with and learn Mathematics. |
| ***STEM - How and where does maths feature?**<br>*John Steinbach (Teacher,* Alexandra Hills State High School) *(All Secondary) (Disposition)*<br><br>Much anecdotal evidence: mathematics is not getting the emphasis it should if STEM is going to make a difference to the workforce, the economy and us. STE have been bestowed with many resources: robots, drones, 3-D printers. Maths not so, why so? Maths, as Alan Finkel reminds us, is the language of science and STEM really means science, engineering and technology using mathematics. If educators forget that, we are truly lost. Are current STEM programs serious? Where does STEM come from? Where is its focus? Let's get back on the right track. How to?<br><br>Served in RAAF for 38 years as aerospace engineer, specialising in airborne weapons systems attaining post of Director of Weapons Engineering. On retirement completed BEd at UQ, awarded QAMT Maths Education Prize 2005. Mathematics and Science teacher, Resolve Champion, Member Mathematics C Panel 2012-2019. Has presented at most annual conferences and contributed multiple articles to Teaching Mathematics. |
| **Group work and open-ended tasks need to form a core of the mathematics classroom.**<br>*Debbie Cooper (HOD Mathematics,* Sunnybank State High School) *(P-10) (Pedagogies)*<br><br>Group investigation leads to a much deeper understanding and facilitates peer tutoring regularly. This presentation will discuss these pedagogical techniques and look into how to effectively design groups and open-ended tasks.<br><br>Debbie Cooper has worked as a maths teacher for 12 years and HOD of maths at Sunnybank SHS for the last two. The work of Jo Boaler has always been a guiding force along with Tierney Kennedy. Changing pedagogy in the maths classroom has always been the goal and making maths accessible for all. |

**On fractions, Directed Number, Geometry and the Order of Operations**
*Joe Ousby (Retired Teacher) (Upper Primary/Junior Secondary) (Pedagogies)*

*Who is teaching these concepts? Who is assuming that the students know because they learnt it in earlier years? Who doesn't have time to pick up the pieces? A workshop on teaching fractions, directed number, gometry and the order of operations and being responsible for all of it with your students, no matter what year or what level you are teaching.*

*Joe has a Bachelor of Science with a double major in Pure Mathematics and Mathematical Statistics, and a Masters of Education majoring in Mathematics Assessment. He has over 40 years of experience teaching junior and senior high school mathematics in Queensland, New South Wales and Singapore. Joe currently tutors students in years 10-12 who are studying or intending to study Mathematical Methods and in some cases Specialist Mathematics. As a tutor he has a window into many senior classrooms around Brisbane and spends most of his tutoring time revisiting concepts from years 5-10. As a result, his students become masterful in Mathematics, achieving much higher grades and often becoming the 'go-to person' in their class when their peer don't understand. In his time as a teacher, Joe has always written and continues to write examinations, worksheets and textbooks. In his spare time, he is a sub-editor on 'Teaching Mathematics', an advocate for great teacher access to data on the QCAA External examination results and pursue my commitment to transforming the teaching of mathematics worldwide.*

**Teaching and learning key content descriptions in AC:M v9.0 Prep to Year 6 - utilising mathematics manipulatives.**
*Monique Russell (QAMT) (Primary)(Pedagogies)*

The Australian Curriculum: Mathematics v9.0 heralds an explicit approach to mathematics teaching that sees proficiency strands embedded within content descriptions and achievement standard statements. What does this mean for your mathematics teaching and student learning? In this session, Monique will highlight key content descriptions and work with participants with appropriate and selected manipulatives to support student's deep understanding in these key areas.

Monique has worked in state schools primary education for 32 years, in varied roles including classroom teacher, Curriculum implementation, Physical education, Numeracy coaching, mathematics coaching and advisor roles. Monique sees the teacher's role in constructing engaging and effective learning activities for mathematics as being critical to students' success and positive disposition for mathematics that can have far-reaching effects past the primary and secondary years. Monique is an executive member of the QAMT and enjoys sharing with and learning from teacher colleagues and encouraging others to continue on their learning journey in mathematics teaching.

**Concurrent Workshops 5 (55min)**

**Simplex and the Science of Burger Making**
*Alastair Lupton (STEM Teacher,* Adelaide Botanic High School) *(Senior Secondary) (Curriculum)*

The simplex algorithm is a powerful tool. A glimpse of its power can be had, long before tertiary study. If considered in two dimensions, it is a rich context for the graphing and solving of linear inequalities in Year 10 Mathematics or Year 11 General Mathematics. This workshop will use the context of designing a “better” hamburger patty to introduce the simplex algorithm. With a video introduction and all the necessary elements for an engaging assessment task, or just a great lesson or two, I bet you can’t wait to sink your teeth into this one (sorry – burgers not included)!

Alastair is a STEM teacher at Adelaide’s STEM-iest new high school. His focus is the ways in which STEM teaching can best support students to succeed in senior secondary mathematics courses, with a special interest in the Mathematical Methods course. Alastair produces video resources as a way to simulate student learning, enhance their use of technology and support them in high stakes assessment tasks.

**Bivariate Data Analysis**
*Dr Michael Bulmer (UQ) and Chris Powell (HOD Mathematics, Brisbane South State Secondary College) (Secondary)(Curriculum)*

In this session we will share some activities to support students in learning bivariate data analysis, including various teaching ideas, tips for designing PSMTs in General Mathematics, and experiences in engaging Year 8 students with scientific data. Along the way we will provide an introduction R, a free software tool for working with data.

Michael is a Senior Lecturer in Mathematics and Statistics at the University of Queensland. He spends his days using technology to engage students from a wide range of backgrounds in learning statistics. In his spare time, he likes creating mathematical puzzles.

**M1 Maths and Astronomy**
*David Ilsley (Casual Teacher, Canterbury College) (All Secondary) (Pedagogies)*

M1 Maths (www.m1maths.com) is a free website containing learning materials (explanations and exercises) designed for independent learning and covering Years 7 to 10 Maths and Mathematical Methods. It could be used as an extra resource or as a substitute for a textbook. There is also an associated astronomy site (www.canterburydarkside.com) with ideas and resources for running an astronomy club and teaching astronomy to students in Years 5 to 12.

David Ilsley has taught maths in schools in Logan City, and has worked as a maths adviser for the South Coast Region, as a curriculum and resources writer for Open Access and the Queensland Studies Authority and as a classroom coach in the Bronx, US. Between 1998 and 2000 he was vice president of QAMT and editor of Teaching Mathematics. He is now retired, doing occasional teaching and running a school astronomy club.

***What has changed in the Australian Curriculum: Mathematics and why? Unpacking the Australian Curriculum: Mathematics version 9.0 changes to the Primary Curriculum.**
*Rachael Whitney-Smith (ACARA)(Primary)(Curriculum)*

ACARA has conducted a review of the Australian Curriculum on the back of a five-year program of research. Education Ministers endorsed the revised Australian Curriculum version 9.0 and approved it for publication on the 1 April 2022 and ACARA will publish the revised curriculum on their new curriculum website in May. This session, presented by Rachael Whitney-Smith, lead for the Australian Curriculum: Mathematics review, will provide Primary teachers with the scope of changes and the reasoning behind them, a demonstration of the functionality of the new curriculum website and how this functionality can assist teachers in their planning and programming.

Rachael is the Mathematics curriculum specialist at ACARA and led the recent Australian Curriculum: Mathematics review. She is also undertaking her PhD at Notre Dame University in Mathematics Education. Rachael is passionate about applied mathematics, STEM and teaching mathematics through rich tasks that engage student thinking and reasoning, problem solving, modelling and investigation processes. Rachael has worked on National and International projects focussed on improving the mathematical outcomes of Australian students and has actively participated in the OECD Education 2030 project. Rachael is an active member on a number of mathematics advisory groups and led the work in revising the National Numeracy Learning Progressions as part of the National Online Formative Assessment Initiative. Rachael has been the Executive Officer, a Professional Learning consultant and is currently a board member for the Mathematical Association of Western Australia and on the board for the Australian Association of Mathematics teachers.

**How can we engage and prepare junior school students for PSMTs in senior mathematics courses?**
*Peter Fox (Texas Instruments) (Sponsor) (All Secondary) (Pedagogies)*

How can we engage and prepare junior school students for PSMT's in senior mathematics courses? Participants in this session will be provided with a series of rich, short, focused investigations that help students develop skills, structure and reasoning. The problems encourage students to collect, display and analyse data, use technology in meaningful ways and summarise their findings using appropriate mathematics and written communications. Tasks range from Year 7 to Year 11.

**Concurrent Workshops 6 (55min)**

**Effective and Efficient Use of the TI-Nspire calculator in a Mathematical Methods (and Specialist) Examination**
*Rodney Anderson (Teacher, Moreton Bay College) (Senior Secondary) (Pedagogies)*

In this workshop participants will explore how to efficiently utilise features of the TI-Nspire non-CAS calculator to answer technology active questions in class and during examinations.

Rodney is a Senior Mathematics teacher at Moreton Bay College, and Vice-President of QAMT. Although an experienced teacher, he is passionate about learning new approaches to teaching mathematics from others at conferences and online discussion groups. He uses many forms of technology in his teaching and is enthusiastic about STEM in the classroom. Rodney shares his experience through presenting online webinars, at conferences around Australia and internationally.

*** What has changed in the Australian Curriculum: Mathematics and why? Unpacking the Australian Curriculum: Mathematics version 9.0 changes to the Year 7 – 10 Curriculum.**
*Rachael Whitney-Smith (ACARA) (*7-10) *(Curriculum)*

ACARA has conducted a review of the Australian Curriculum on the back of a five-year program of research. Education Ministers endorsed the revised Australian Curriculum version 9.0 and approved it for publication on the 1 April 2022 and ACARA will publish the revised curriculum on their new curriculum website in May. This session, presented by Rachael Whitney-Smith, lead for the Australian Curriculum: Mathematics review, will provide Secondary teachers with the scope of changes and the reasoning behind them, a demonstration of the functionality of the new curriculum website and how this functionality can assist teachers in their planning and programming and the background to the Year 10 Pathways resource.

Rachael is the Mathematics curriculum specialist at ACARA and led the recent Australian Curriculum: Mathematics review. She is also undertaking her PhD at Notre Dame University in Mathematics Education. Rachael is passionate about applied mathematics, STEM and teaching mathematics through rich tasks that engage student thinking and reasoning, problem solving, modelling and investigation processes. Rachael has worked on National and International projects focussed on improving the mathematical outcomes of Australian students and has actively participated in the OECD Education 2030 project. Rachael is an active member on a number of mathematics advisory groups and led the work in revising the National Numeracy Learning Progressions as part of the National Online Formative Assessment Initiative. Rachael has been the Executive Officer, a Professional Learning consultant and is currently a board member for the Mathematical Association of Western Australia and on the board for the Australian Association of Mathematics teachers.

**Enhancing the teaching of General Mathematics with a scientific calculator**
*Peter Flynn (Texas Instruments) (Senior Secondary – General Mathematics) (Pedagogies)*

In this session, participants will experience ways in which a scientific calculator can be used to enhance the teaching of General Mathematics. Topics covered will include linear and non-linear relationships, bivariate statistics and growth and decay in sequences. A primary focus will be to illustrate how a scientific calculator can be used as a valued teaching and learning tool in both General Mathematics and Years 7-10 Mathematics.

Peter's mathematics education interests involve implementing technology into mathematics teaching, learning and assessment. Peter is an experienced $T^3$ Instructor who has presented many workshops to both Australian and international audiences.

**High yield daily routines that build Mathematical understanding and discussion**
*Elizabeth Irwin (South East Regional Office, Education QLD) (P - Year 3) (Pedagogies)*

Daily mathematical routines are low preparation and high yield short activities focused on building strong number sense and classroom discourse through more student thinking, talking and reasoning with students sharing strategies that make sense to their learning with their peers. This early years focused workshop will immerse participants in various hands-on routines that can be quickly and easily implemented, all aligned to the Maths proficiencies of the Australian Curriculum and building rigorous student discussion in the classroom.

Liz Irwin (ed.D) is currently Senior Education Officer-Pedagogy at South East Region, Department of Education, Queensland. Prior to her recent work in Queensland, she has worked as a Mathematics and leadership consultant in New York City and surrounding districts for 17 years. In this work, she focused on coaching teachers and leaders in whole school change with effective Mathematics teaching and learning informed by student data. This involved an emphasis on supporting educators in refining both pedagogical practices and content knowledge, to improve outcomes for every student.

**Teaching statistics with experiential learning: A visual experience**
Margaret Marshman (Deputy Head of School – Learning and Teaching, USC) (Senior Secondary) (Pedagogies)

We live in a data drenched society where good statistical thinking and analysis skills are essential. However, because statistics education often focusses on knowledge and skills, many people do not understand or value statistical thinking. Experiential learning is the process whereby learning occurs following an experience and reflection on that experience. We present a series of activities that cover random and non-random sampling; ways to present data (as graphs and tables); the most appropriate measure of the average (mean or median); and constructing survey questions which will allow your students to experience the statistical concepts.

Dr Margaret Marshman is the Deputy Head of School Teaching and Learning at the University of the Sunshine Coast. Prior to working at universities, she was a secondary mathematics and science teacher and mathematics Head of Department on the Gold Coast. She is involved in teacher education in the undergraduate and Master of Teaching programs. Margaret coordinates the Mathematics Teachers Hub of the Sunshine Coast.

**Concurrent Workshops 7 (55min)**

**Modular Mastery-Based Learning**
*Joel Scott (Raybould Tutorial Fellow, UQ) (Secondar*y) (Pedagogies)

With the growing prevalence of online Modular Mastery-Based systems, many schools are implementing them with a variety of outcomes. This research has considered the relationships between established measures of student performance with the Maths Pathway data provided as part of the system. This data allows us to consider how much confidence we ought to have in the data provided through these Modular Mastery-Based systems.

Joel completed initial teacher training at UQ in 2012, after a couple of years in far Western NSW, then a few more in slightly less far Western NSW returned to Brisbane to complete a Master of Educational Studies (leadership). He then taught for two completely average years on the North side of Brisbane before being awarded the Raybould Tutorial Fellowship at UQ for 2022. Joel is interested in mastery-based learning and the appropriate leveraging of technology to benefit students and teachers. He really enjoys working with middle school classes across mathematics and science as well as senior mathematics classes. He and his wife live in a two-bedroom apartment in St Lucia with 4 small children which is very convenient for his commute and very inconvenient when anyone needs alone time.

**Developing Your Identity as a Teacher of Mathematics**
*Darius Samojlowicz (MANSW)(TBC) (Pedagogies, classroom)*

We are constantly developing who we are as a teacher. We develop our teaching practices through the experiences we have, the influences around us and the professional interactions we engage in. These all contribute to building your identity as a teacher of mathematics. All teachers, early career teachers through to the most experienced practitioners, working in a metropolitan, regional, rural or remote school all benefit from participation in a community of practice where they can build skills, knowledge, understanding and self-confidence. This session will show you the strengths of, and how to be a part of your teaching community.

Darius Samojlowicz is the Executive Officer of the Mathematical Association of NSW. He has extensive experience working with schools and teachers from all sectors throughout the country. He has engaged in numerous pedagogical research projects including the use of ICT in education to improve students' outcomes, and cultures of teacher performance and development. He is currently implementing a 3-year research project investigating the elements required to support teachers of mathematics in regional, rural and remote NSW. Darius is also working with Numeracy Instructional Coaches within the Diocese of Wollongong on a 3-year project supporting them to embed numeracy across the 7 – 12 curricula.

***Engaging and Challenging Students in Mathematics - NMTQ, QSC and 5/6, 7/8 Maths Quiz, PSC**
*TBC (all years)*

**Design principles in open-ended tasks and creating collaborative learning environments.**
*Alex Bunt (Mathspace) (Sponsor) (Junior secondary) (Pedagogies)*

Design principles in open-ended tasks and creating collaborative learning environments: An equitable learning environment is one where all students are given the same opportunities to learn. With an increasing focus on critical thinking and problem-solving skills, we are challenged as teachers to deliver rich tasks in mathematics that students with varying levels of understanding can engage with. Join me to discuss how 12 design principles have informed the development of open-ended group-based tasks at Mathspace, with practical strategies for engaging task design.
Alex is an experienced secondary Math and Physics teacher with a passion for meeting the needs of every learner. From proficiency scales to scaling technology for continuous assessment, he believes empowering students with a growth mindset is the key to success in mathematics. Today, Alex works with Mathspace to support teachers everywhere in providing the right help at the right time for every student.

***Two Year 10 PSMT's to prepare for Year 11 Mathematical Methods***
*Shelly Cross (HOD Mathematics) St Hilda's School*

The first PSMT will be using linear functions, the second uses linear and non-linear functions covered in the Year 10A Mathematics course. We will discuss how we help students to develop understanding for the 4 criteria in the Year 11 ISMG; showcase the TI Nspire software used to develop the models; and discuss our learning through the process. This will be co-presented with Mr Evan McGarrity.

**Bill Simpson Closing plenary** - Bill Simpson

I started my teaching career "on a different planet far, far away" where male teachers dressed, all year round, in long-sleeved shirts, long trousers and a tie. When Inspectors, came we wore suits. Class sizes were 40, frequently more, and the work program for Senior Mathematics1 fitted on one side of a sheet of foolscap. Early primary students wrote on slates and cleaned them with a wet rag. Technology was a black/green chalk-board, given a new coat of paint every 2 or 3 years. If you were lucky, there was a duster (well named object!) to clean it. Much excitement arose when my third school purchased a sound tape recorder. I could not find any applications for it in Maths! I owned a wooden slide rule but they were not used in schools. Calculators and mobile phones were in the future but each secondary student carried a set of logarithm tables. My first pay cheque was for 30 pounds (after tax). My third secondary school had 1800 students, a principal, a principal mistress, one deputy principal and one office lady. There was some uncertainty as to whether it was the principal or the office lady who ran the school! The girls uniform included black stockings and gloves. Female married teachers were dismissed at the beginning of the Christmas holidays and were re-hired at the beginning of the next school year. The general community held teachers in great esteem. In my second school, I struggled to hide my embarrassment when veteran farmers who had struggled with "drought and flooding rain" addressed me as Sir or Mr. Simpson. However, I thought I had a great job, and never thought of swapping it for anything else. In this talk, I will comment on the highs and lows of the curriculum changes of the succeeding 40 years.