# Mathematics Educational Software Interest Group
## Visual storytelling

Thursday 12 December 2019

Western Sydney University, Parramatta South campus*

EB.G.02

| Time | Session |
|---|---|
| 9:45–10:15 | Registration, tea/coffee |
| 10:15–11:00 | **Roozbeh Hazrat** <br> Computational thinking, abstract thinking |
| 11:00–11:20 | Morning tea |
| 11:20–11:50 | **Michael Jennings** <br> UniDoodle audience response system (note that this talk will be interactive so please download the app onto your device beforehand from http://www.unidoodle.com) |
| 11:50–12:20 | **Jonathan Kress** <br> Simple online games for first year |
| 12:20–12:50 | **Daniel Mansfield** <br> Linear Algebra Virtual Reality |
| 12:50–1:50 | Lunch |
| 1:50–2:50 | **Pavel Krivitsky** <br> LyX and knitr: using literate programming to prepare lecture materials for statistics |
| 2:50–3:20 | **Jim Pettigrew** <br> Maths in computational design |
| 3:20–3:30 | What's next? |

*__The Parramatta South campus is on the corner of James Ruse Drive and Victoria Road.__

**WESTERN SYDNEY**
UNIVERSITY

## Abstracts

**Invited talk**

**Professor Roozbeh Hazrat (WSU, R.Hazrat@westernsydney.edu.au)**
**Computational thinking, abstract thinking**

We give a report on the unit Computer Algebra at Western Sydney University where the software Mathematica is used to explore mathematical concepts.

**Other talks**

**Michael Jennings (UQ, msj@maths.uq.edu.au)**
**UniDoodle audience response system**

UniDoodle is a classroom response app which allows students to quickly submit sketch-style answers via their iOS or Android device to questions asked by their teacher in class. Audience response systems traditionally allow students to only answer multiple-choice questions. Students either phone a number to submit their answer or click a button on a clicker. While UniDoodle does have the multiple-choice option, the key difference is that students can submit answers in a range of formats. In this talk I will discuss how UniDoodle has been used in two large first-year mathematics courses at The University of Queensland, providing rich, immediate information on students' mathematical understanding.

This talk will be interactive so please download the app onto your device beforehand from http://www.unidoodle.com

**Associate Professor Jonathan Kress (UNSW, j.kress@unsw.edu.au)**
**Simple online games for first year**

In this talk I will demonstrate some JavaScript games created for use in first years maths lessons. These games have not yet been tested in the classroom, so questions and feedback about their purpose and the practicalities of their use are welcome.

**Dr Pavel Krivitsky (UNSW, p.krivitsky@unsw.edu.au)**
**LyX and knitr: using literate programming to prepare lecture materials for statistics**

In this talk, I will share my experiences using an open-source tool chain for preparing lectures – particularly those involving worked algebraic and numeric examples. It combines the LyX document processor, a "WYSIWYM" (What You See Is What You Mean) editor that uses LaTeX as a backend; and knitr, a literate programming package that allows R program code to be embedded into a LaTeX document and evaluated with results sub-

stituted into the document. Steps and results of a calculation can therefore be typeset and regenerated as needed. Applications include regenerating a data analysis when data change (e.g., based on data collected from the class) and propagating changes to a numeric example without having to redo the calculation "by hand", reducing potential for errors.

**Dr Daniel Mansfield (UNSW, daniel.mansfield@unsw.edu.au)**
**Linear Algebra Virtual Reality**

Two dimensional linear algebra can be effectively visualised using traditional teaching tools, such as a pen and paper. Here we demonstrate three dimensional concepts from linear algebra using virtual reality as a three dimensional visualisation tool. This will be a hands-on introduction to a new app developed at UNSW.

**Dr Jim Pettigrew (WSU, j.pettigrew@westernsydney.edu.au)**
**Maths in computational design**

In this talk I will discuss some of the unexpected mathematical challenges that a group of final-year computing students encountered in creating computation design artefacts using the Processing coding system.