

## IT ALL STEMS FROM MATHS

On Monday 20<sup>th</sup> May 2019, EPI•STEM, the National Centre for STEM Education based in the University of Limerick, announced a new initiative “Numeracy Across the Curriculum” (NAC). A year-long research and development project with the goal of developing strategies for teaching numeracy across the curriculum, the initiative will be piloted in primary and secondary schools across



Pictured Jerry O'Sullivan, Deputy Chief Executive ESB, Prof. Kerstin Mey, Vice President Academic Affairs & Student Engagement, University of Limerick, Prof. Merrilyn Goos, Director of EPI•STEM University of Limerick and John O'Donoghue, Prof. Emeritus University of Limerick.



Pictured Prof. John O'Donoghue, Professor Emeritus UL, Prof. Merrilyn Goos, Director of EPI•STEM UL, Jerry O'Sullivan, Deputy Chief Executive ESB, Prof. Kerstin Mey, Vice President Academic Affairs & Student Engagement, UL and Prof. Patricia Mannix-McNamara, Head of the School of Education, UL.



Pictured Jerry O'Sullivan, Deputy Chief Executive ESB and Professor Merrilyn Goos, Director of EPI•STEM University of Limerick, at the announcement of the “Numeracy Across the Curriculum” (NAC) initiative by EPI•STEM, the National Centre for STEM Education in University of Limerick

Limerick and Clare from August. Numeracy connects the mathematics learned at school with real-world situations that require problem-solving and critical judgment. For numeracy to be useful to students it needs to be learned in multiple contexts and in all school subjects – not just mathematics. The initiative is based on ten years of research undertaken by Professor Merrilyn Goos (Director of EPI•STEM) and her Australian colleagues Vince Geiger, Shelley Dole, Helen Forgasz and Anne Bennison. Pulling from their extensive research, Goos and her colleagues developed guidance for teachers on how to embed numeracy across all subjects within the curriculum and to support teachers in assessing numeracy learning and dealing with the challenges of working within the boundaries of specific subjects. Goos and her colleagues have published their findings in the book “Numeracy Across the Curriculum: Research based strategies for enhancing teaching and learning” which was officially launched in conjunction with the NAC initiative. Speaking at the launch Goos announced that, “Empowering teachers to help their students use mathematics to solve every day problems, or make evidence based judgements, can be transformational. It is about looking at maths not from a closed discipline /subject perspective but how it is applied in real life contexts.” The book provides a practical guide for both pre service and in service teachers, on understanding numeracy and its application in both primary and post primary secondary schools in Ireland. Seven schools across the Limerick/Clare region have been selected to take part in the pilot scheme. “The programme will establish meaningful and beneficial connections between schools across the Limerick and Clare region and my team here in UL, while simultaneously addressing a national priority by developing schools of excellence in the area of numeracy, and ensuring that teachers equipped with the skills to become Numeracy Ambassadors/ Champions.” added Goos. The “Numeracy Across The Curriculum” project seeks to develop teachers’ understanding of numeracy, while also guiding teachers on how to recognise and embed numeracy opportunities within their subject area. It will provide teachers with ideas, classroom activities and resources that they can use to develop students’ numeracy skills and will offer practical guidance for both schools and teachers. Speaking at the launch, Jerry O’Sullivan, Deputy Chief Executive, ESB, welcomed the launch of the book and the initiative. “The “Numeracy Across The Curriculum” project will provide teachers with ideas, classroom activities and resources that they can use to develop students’ numeracy skills and will offer practical guidance for both schools and teachers.” “ESB is committed to supporting STEAM education and learning as a way of empowering young people to fulfil their potential, and encouraging them to positively engage with the issues and challenges facing society. Initiatives like the “Numeracy Across the Curriculum” project, with the goal of supporting positive dispositions towards the use of mathematics to solve problems encountered in day-to-day life, can only benefit young people and enable them to develop the skills necessary to critically assess the world around them and become the problem solvers and innovators of the future”. The “Numeracy Across the Curriculum: Research based strategies for enhancing teaching and learning” book is available now and can be accessed by all pre service or in-service teachers as a guidance tool. The “Numeracy Across the Curriculum” pilot scheme will kick off in schools across Limerick in August 2019.



## Career Mathways Awards Night

On February 26<sup>th</sup> 2019, EPI•STEM hosted an awards night for the Career Mathways initiative, which ran in six schools across Ireland from September 2018 until January 2019. Career Mathways was a novel and exciting, Science Foundation Ireland (SFI) funded project designed for Transition Year students. The project was designed by a team of mathematics education researchers based in EPI•STEM.

Career Mathways aligns with the goals of the SFI Discover Programme as it seeks to promote STEM, and in particular mathematics, among Transition Year students; their parents; their mathematics teachers as well as career guidance teachers. The initiative aimed to highlight the mathematics underpinning a variety of careers, as a way of enhancing student engagement across all STEM subjects. To achieve this goal the project team engaged with several well-known, high profile personalities (e.g. Jacqui Hurley [RTÉ Sports Correspondent]; Lizzie Lyons [TV3 Chef & Entrepreneur]; Dean Strang ['Making a Murderer' Lawyer]; Joanna Donnelly [Meteorologist, Met Eireann]) and other professionals, who all kindly volunteered their own time to act as STEM Ambassadors. In their role as STEM Ambassadors these professionals recorded an interview with the Career Mathways research team, in which they explored the different types of mathematics they use in their careers and highlighted how important it is to have a good understanding of mathematics and be proficient in the subject.



Pictured Ardscoil Rís, National Competition Winners

As such, the project sought to make mathematics more visible and fascinating to students and it was hoped that it would help teachers when faced with the common question, “Where will I use this again?” As part of the initiative, students in participating schools were invited to conduct an interview with a professional in their locality to investigate where and when this person uses mathematics. They then submitted a video containing excerpts from this interview and a poster designed around the interview to the Career Mathways competition which was seen as the culmination of the project. The professions investigated included surgeons, accountants, farmers, baristas, opticians, among others, and the quality of competition entries was extremely high. On February 26<sup>th</sup>, school winners and national winners were recognised at a ceremony held in University of Limerick. Ardscoil Rís, were crowned National competition winners. Other winners that were awarded on the night were: Coláiste Phádraig, Lucan, St. Leos College Carlow, St. Brendans Community School Birr and Crescent Comprehensive School, Limerick.

## STEMChAT

On 14<sup>th</sup> February 2019, Minister for Training, Skills, Innovation, Research and Development, John Halligan TD, announced a national investment of €3.6 million through Science Foundation Ireland’s Discover Programme, to fund projects dedicated to educating and engaging the public in science, technology, engineering and maths (STEM).

SFI has awarded EPI•STEM, the National Centre for STEM Education, €35,880 for its project ‘STEMChAT’. STEMChAT – Women as catalysts for change in STEM education – aims to recruit female undergraduate STEM Champions and industry mentors who will facilitate informal workshops with school students and parents, predominantly in disadvantaged areas.

This project develops innovative approaches to address the significant under-representation of women in the STEM workforce in Ireland. By creating new, engaging approaches to providing career information for school students and parents, the project will address barriers to STEM careers experienced by females that were identified in the 2016 report on STEM Education in the Irish School System.

**STEMChAT**  
Initiative for Secondary Students and their Parents

**STEMChAT**

**MAY SESSIONS**  
Bank of Ireland Workbench, 125 O'Connell Street, Limerick  
Friday 3rd, 10th & 17th May 4.00pm-6.00pm  
Learning Hub Limerick, Kildenny House, New Road, Kildenny, Limerick  
Thursday 16th, 23rd, 30th May 3.00pm-5.00pm

**SEPTEMBER SESSIONS**  
Bank of Ireland Workbench, 125 O'Connell Street, Limerick  
Wednesday 11th, 18th & 25th September 5.00pm-7.00pm  
Learning Hub Limerick, Kildenny House, New Road, Kildenny, Limerick  
Thursday 12th, 19th & 26th September 3.00pm-5.00pm

- Find out what STEM (Science, Technology, Engineering & Mathematics) education and careers is all about.
- Talk to our STEM Undergraduate and Industry Professionals.
- The STEMChAT project will help answer questions about studying STEM in college and STEM careers.
- Drop into our series of workshops in Bank of Ireland Workbench and the Learning Hub running in both May and September 2019.

To register your attendance or find out more information, contact us:  
EPI•STEM National Centre for STEM Education, University of Limerick, Ireland  
Tel: 061 234789 | Email: [info@epistem.ie](mailto:info@epistem.ie)

Logos for University of Limerick, SFI, and other partners are at the bottom.

The distinctive feature of the project is the recruitment of female undergraduate STEM Champions and industry mentors who will facilitate informal, small-group workshops with school students and parents. Resource packages based on these workshops will be developed and disseminated to participating schools and career guidance counsellors. Our approach capitalises on the successful partnership between EPI•STEM and Johnson and Johnson via the WiSTEM<sup>2</sup>D programme, which empowers females studying STEM subjects in third level by increasing their STEM networks, connecting them to STEM industry role models and debating gender stereotypes in STEM.



## Adults Mathematics and Work: from Research into Practice

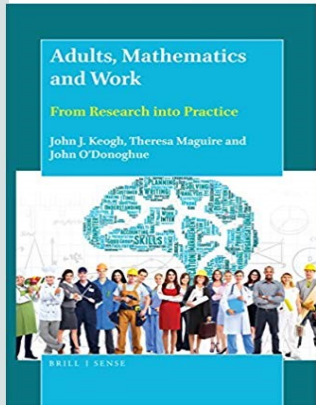
The book launch of “Adults Mathematics and Work: from Research into Practice” co-authored by John Keogh, Terry Maguire and John O’Donoghue took place on Thursday 28<sup>th</sup>

February 2019 in the Royal Irish Academy, Dublin.

This book includes a series of tools that can be used to capture the mathematics people do at work or during their leisure time activities in a way that can be mapped onto Ireland’s National Framework of Qualifications. The recognition of the depth and breadth of their own experience can change an

individual’s self-perception and enables them to re-contextualise their knowledge, skills and competence for other purposes, whether to adopt new work practices or to ‘hit the ground running’ in a new employment context . This book can be purchased from BRILL

<https://brill.com/view/title/39116?lang=en>

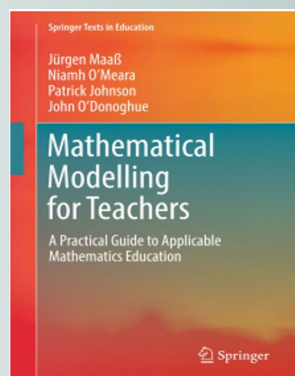


Pictured Emeritus Professor John O’Donoghue (co-author, University of Limerick), Mr Thomas Stone, Principal, Technological University Dublin, Tallaght Campus, Emeritus Professor Diana Coben (University of East Anglia and visiting Professor of Kings College London) , Dr John Keogh (co-author), Dr Terry Maguire (co-author), Professor David Fitzpatrick (President Technological University Dublin), Mr Thomas Hefferon (CEO, Royal Energy Limited).

## Mathematical Modelling for Teachers: A Practical Guide to Applicable Mathematics Education

“Mathematical Modelling for Teachers: A Practical Guide to Applicable Mathematics Education” co-authored by Jurgen Maaz, Niamh O’Meara, Patrick Johnson, John O’Donoghue, was published in October 2018.

Applicable mathematics involves reality-based mathematics education, that is teaching mathematics through problems that people encounter on a day-to-day basis. Real-



ty-based mathematics relies heavily on problem solving and promotes a positive disposition to engage with mathematics. This book guides teachers and teacher educators through different modelling problems and highlights how these could be used in the classroom. Readers will gain first-hand experience of new approaches and materials that will enable them to adopt this innovative approach to mathematics education in their own classroom.

This book can be purchased from Springer

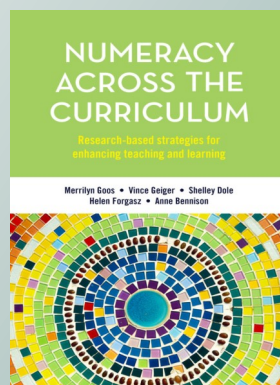
<https://www.springer.com/us/book/9783030004309>

## Numeracy Across the Curriculum: Research-based strategies for enhancing teaching and learning

“Numeracy Across the Curriculum: Research-based strategies for enhancing teaching and learning” co-authored Merrilyn Goos, Vince Geiger, Shelley Dole, Helen Forgasz and

Anne Bennison was recently published in December 2018.

This is a guide for pre-service teachers on understanding numeracy and its application in both primary and secondary schooling. The text explains what numeracy is and how numeracy has developed as an educational goal. It describes in detail the five dimensions of the authors’ model: attention to real-life con-



texts; application of mathematical knowledge; use of physical, representational and digital tools; the promotion of positive dispositions towards the use of mathematics to solve problems encountered in day-to-day life; & a critical orientation to interpreting mathematical results and making evidence-based judgements.

This book can be purchased from ALLEN&UNWIN <https://www.allenandunwin.com/browse/books/academic-professional/education/Numeracy-Across-the-Curriculum-Merrilyn-Goos-Vince-Geiger-Shelley-Dole-Helen-Forgasz-and-Anne-Bennison-9781760297886>

## Junior Mathematics Enrichment (JME) programme

The Irish Mathematical Trust, with support from SFI, EPI • STEM and the University of Limerick, recruited students for the Junior Mathematics Enrichment (JME) programme. The JME programme aimed to offer students a wider perspective on Mathematics and its role in life and society, while developing their problem solving skills in an environment centred on the enjoyment of investigation and discovery, among like-minded peers. The JME consisted of 9 weekly enrichment classes that were held in the University of Limerick and led by pre-service mathematics teachers.



## Second phase of computer coding at Junior Cycle

In September 2018, Úna Fleming, who is a post-primary teacher and former graduate of the University of Limerick and Hibernia College Dublin, was appointed as a researcher, through Lero - the Irish software research centre and Science Foundation Ireland (SFI) to EPI • STEM, the National Centre for STEM Education at the University of Limerick (UL). Ms. Fleming was given the task of examining the rollout of the short course in Coding as well as documenting the experiences of the schools and teachers enrolled in the Junior Cycle Coding in Action programme (JCCiA). The JCCiA programme, is a CPD initiative designed and run by the Junior Cycle for Teachers (JCT) to support teachers and schools as they introduce the short course in Coding to their students. As part of the research project, Ms. Fleming took on the responsibility of conducting a review of year one of the JCCiA programme. She began by analysing the data which was gathered by the JCT during 2017. An interim report entitled 'Junior Cycle Coding in Action- a CPD initiative to support the introduction of the Junior Cycle short course Coding' was produced following careful analysis of the data.

On Friday the 1<sup>st</sup> March 2019, the report was made available to the public at the JCCiA national event which took place in the Hudson Bay Hotel Athlone.



Pictured Gerard Duff, Junior Cycle for Teachers, Clare McInerney, Lero, Dr Padraig Kirk, JCT, Una Fleming, University of Limerick

## WiSTEM<sup>2</sup>D Team Project and International Women's Day

On the 8<sup>th</sup> March 2019 at the International Women's Day conference held in the Bernal Institute on the University of Limerick campus, twenty WiSTEM<sup>2</sup>D Team Project Award winners were presented with their awards. The programme aims to assist female undergraduate students investigating issues that hinder female students participating in STEM at undergraduate level and pursuing a career in STEM field. The WiSTEM<sup>2</sup>D Project launched in 2015 with the aim of increasing representation of women in STEM<sup>2</sup>D fields. This initiative supports and inspires female students of all ages in pursuit of careers and their studies in STEM<sup>2</sup>D. The project, in its third year, is highly successful and has become a talking point at conferences such as International Women's Day. This awards presentation embraced the importance of the University of Limerick and Johnson and Johnson collaborative educational programme to support and encourage female stu-

dents to pursue careers in STEM<sup>2</sup>D fields. Through the programme, the female undergraduate students build friendships, networks and skills that they can use and will rely on throughout their progression as professionals.



Pictured WiSTEM<sup>2</sup>D Team Awards Presentation

## Honorary Appointment University of Technology Sydney (UTS)

Professor Merrilyn Goos won an Honorary appointment to the University of Technology Sydney (UTS) as a Distinguished Visiting Professor. This scheme provides opportunities and financial support for esteemed international researchers to collaborate with UTS academics for a period of between one and six months. Merrilyn was a resident at UTS for the month of March 2019, working in the STEM Education Futures Research Centre. The Centre embraces research of the disciplines within the STEM umbrella, and adopts a cross-disciplinary approach to increase STEM capacity and capability of the future workforce. Aligned with the UTS inclusive model of social justice and diversity, the Centre research also focuses on STEM education equality in gender, indigenous education and students from disadvantaged backgrounds. One of the goals of Merrilyn's visit was to strengthen relationships between her research team in EPI • STEM and the STEM education researchers at UTS. There was an opportunity to explore Faculty-level collaborations around joint PhD programs and internationalisation.

## Inaugural Lecture

The Inaugural Lecture of Professor Merrilyn Goos took place on Thursday 25<sup>th</sup> April 2019. The Title of her talk was "STEM education for Ireland: From ambition to action"



Pictured Prof. Patricia Mannix McNamara, Head of School of Education, Prof. Merrilyn Goos, Director EPI • STEM, National Centre for STEM Education and Prof. Rachel Msetfi, Dean Faculty of Education and Health Sciences.



## CENF

CENF is an ERASMUS+ funded project. In December 2018, four countries, The Netherlands, Austria, Spain, and Ireland initiated the first steps to develop a Common European Numeracy Framework (CENF). This project commenced in earnest in January 2018 when Dr. Niamh O'Meara and Ms. Kathy O'Sullivan (EPI•STEM) travelled to Utrecht for the first partners meeting. At this meeting the team devised a working plan for the project and UL is responsible for the derivation and distribution of the surveys which will underpin the framework and contribute to the development of the resources for adult numeracy tutors across Europe. The development of the research instruments has now begun in UL and it is hoped that they will be distributed to leading adult numeracy agencies across European countries in Summer 2019.

## CERME11

The Eleventh Congress of the European Society for Research in Mathematics Education (CERME11) took place in Utrecht from February 6<sup>th</sup> to February 11<sup>th</sup> 2019. EPI•STEM was well represented at this conference with Prof. Merrilyn Goos, Dr Ciara Lane and Dr Niamh O'Meara attending. Niamh presented findings from her study which investigated teachers' knowledge and understanding for teaching algebra and how this differed between primary and post primary teachers. Other projects that Niamh was involved with included the ERASMUS+ project and the investigation into the Bonus Points Initiative in Ireland. Ciara presented on a project she is working on with Dr Gráinne Walshe to investigate the mathematical preparedness of first year students for studying science and engineering at third-level. The presentation described this project which aims to explore students' mathematical preparedness for STEM education at tertiary level in the Irish context.

## End of Year Event: WiSTEM'D

The 25<sup>th</sup> of April 2019, brought the 2018/19 WiSTEM'D Programme year to a close with the end of year event held in the Millstream Common Room in the University of Limerick. The informal event was attended by staff from EPI•STEM, the faculty of Science and Engineering as well as some from the School of Education to thank everyone for helping throughout the year's events.



Pictured WiSTEM'D Students

The female students on the 2018/19 program attended which gave them a great opportunity to meet before sitting their Spring Exams and reflect on the last few months in what they have achieved and the opportunities along the way.

## Science Scope

Science Scope is a monthly 4-page supplement published on Mondays by the Irish Independent in partnership with EPI•STEM, the National Centre for STEM Education and covers important curriculum topics across Biology, Chemistry and Physics, all whilst complying with both old and new Science specifications.

The supplement proves to be a valuable resource for both teachers and students in preparation for the Junior Cert exams as it can act as both a learning and study tool depending on the stage the student is at. Over 9 issues, students engage with scientific applications in a way that is relevant to them. A provisional content plan is also sent to teachers, so they can plan their year ahead. Each copy costs just €0.30 and comes delivered to schools with the Irish

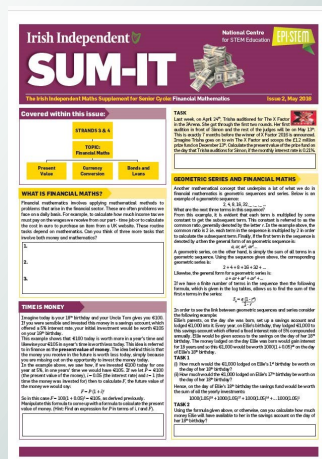


Independent. All 9 issues cost just €4.50 per student. This offer is exclusive to schools. Order online at [schools.independent.ie](http://schools.independent.ie), or email [schoolorders@independent.ie](mailto:schoolorders@independent.ie) for more information.

## Sum It

Sum It is a monthly 4-page supplement published on Wednesdays by the Irish Independent in partnership with EPI•STEM, the National Centre for STEM Education.

Through real life applications relevant to students, Sum It



provides new means of understanding mathematical concepts that will help them to prepare for the Leaving Cert exams. Content plans and solutions are sent to customers as well as access to some additional online content relevant to specific issues of Sum It. Each copy costs just €0.30 and comes delivered to schools with the Irish Independent. All 9 issues cost just €4.50 per student.

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## EPI • STEM Lecture Series



### **Talk by Professor (Emeritus) Diana Coben, King's College, London**

On Monday 4<sup>th</sup> March 2019 Professor Diana Coben, (PhD FRSA FHEA) Emeritus Professor of Adult Numeracy at King's College London and Visiting Professor in the School of Education and Lifelong Learning at the

University of East Anglia, UK visited EPI • STEM, the National Centre for STEM Education and gave a talk entitled: "Numeracy for Nursing: A challenge for safety-critical workplace mathematics". The seminar outlined current thinking on numeracy for Nursing, drawing on her long-term interest in safety-critical workplaces and in particular, her experience as a member of an interdisciplinary international team undertaking translational research in this critically important area.



### **Talk by Professor Janette Bobis, University of Sydney**

On Friday 12<sup>th</sup> April 2019 Professor Janette Bobis, Professor of Mathematics Education and Director of Research in the Sydney School of Education and Social Work at the University of Sydney, visited EPI • STEM, the

National Centre for STEM Education and gave a talk entitled: "Developing the Conceptual Sophistication for Ambitious Teaching of Mathematics". The seminar outlined findings of a study aimed at improving prospective primary teachers' enactment of targeted practices for teaching mathematics in ambitious ways when opportunities to approximate such practices were provided across university and school settings



### **Talk by Professor Katherine Safford-Ramus, Saint Peter's University, New Jersey**

On Thursday 2<sup>nd</sup> May 2019 Professor Katherine Safford-Ramus, Professor Emerita of Mathematics at Saint Peter's University, Jersey City, New Jersey visited EPI • STEM, the National Centre for STEM Education and gave

a talk titled: "Getting Started with OER: A Guide to Finding, Reviewing, and Creating". The seminar drew on findings from a 3-year project of the United States Department of Education titled *Power in Numbers: Advancing Math for Adult Learners*. For those new to OER, the talk introduced and explained the benefits of its use in adult education, and provided resource recommendations and a step by step guide for how to get started. For the experienced OER user, it discussed insights from project research and efforts curating and testing OER resources.

## Visiting Fellow– Scheme

EPI • STEM, has recently commenced a Visiting Fellow Scheme. The Visiting Fellow Scheme is designed to enhance the STEM research community at UL by fostering collabora-

tion between Visiting Fellows and academic staff at EPI • STEM, UL. Fellow recipients will benefit from working with EPI • STEM research staff in conducting research and getting involved in activities to benefit the centre. The title of EPI • STEM Visiting Fellow may be conferred on suitably qualified visitors who wish to exchange expertise, carry out joint research and teaching development, etc., with members of EPI • STEM. As a general rule, Visiting Fellows will have a background and/or current research directions compatible with members of EPI • STEM's teaching and research staff. Details and application available <http://epistem.ie/wp-content/uploads/2019/03/Visiting-Fellow-Application-Form.pdf>

## EPI • STEM In-Residence Visitors



**Dr Margaret Marshman**, Senior Lecturer, Mathematics and Physics Education University of the Sunshine Coast, Australia, in residence from February-June 2019. Margaret is currently conducting research in collaboration with Prof. Merrilyn Goos and Dr. Ciara Lane on a project to determine how Irish post primary

mathematics pre-service teachers (PSTs) negotiate differences in beliefs about pedagogy of their mathematics and mathematics education lecturers. This builds on a study begun in Australia determining the beliefs about mathematics and its teaching and learning of mathematicians and mathematics educators and their pre-service teachers. They will compare the pre-service teacher experience in both countries and develop strategies to support pre-service teachers develop the resilience and confidence needed to negotiate future school environments where there is tension between their beliefs and the beliefs of others they are working with. Dr Ciara Lane and Dr Margaret Marshman will also be investigating teacher beliefs in Ireland and Australia.



**Ms Suzanne Crowley** PhD scholar, University of Tasmania, Australia. in residence from March-October 2019. Suzanne is currently conducting research in what insights might emerge from an exploration of embodied experience of the Visual Arts in relation to the STEM (science, mathematics, engineering and

mathematics) disciplines?

The aim of the research is to contribute to understandings of how the intersection between Visual Arts pedagogical content knowledge and artist practice can inform learning. This study applies a feminist lens as a framework to juxtapose Visual Arts pedagogical content knowledge, my approaches to creative practice, with STEM disciplines in order to define thinking around cross/intra/para/supra disciplinarity and how this might inform a pedagogy for STEAM.

## New Appointments



Nichola Keegan, Administrator



Sila Kaya, Research Assistant



Aoife Guerin, Postdoctoral Researcher

## New Master Students



Una Fleming funded by SFI  
(supervised by Dr O McGarr & Prof. M Goos)



Tracey O Connell funded by Johnson & Johnson  
(supervised by Prof. M Goos & Dr R Kelly)

## New PhD Student



Achmad Nizar funded by NISE  
(supervised by Prof. M Goos, Dr N OMeara & Dr C Lane)

## EPI-STEM Recent Publications

**Kelly, R., Erduran, S.** (2019) Understanding aims and values of science: developments in the Junior Cycle Specifications on nature of science and pre-service science teachers' views in Ireland. *Irish Educational Studies*, 38(1), 43-70.

**Lane, C. & Ní Ríordáin, M.** (2019). Out-of-field teachers' beliefs and practices: An examination of change and tensions using zone theory. *International Journal of Science and Mathematics Education*. DOI: <https://doi.org/54.5441/s54107-019-09964-5>

**Kelly, R., McGarr, O., Lehane, L., & Erduran, & S.** (January 2019) STEM and gender at university: focusing on Irish undergraduate female students. *Journal of Applied Research in Higher Education*

**O'Meara, N., Prendergast, M., Cantley, I., Harbison, L., & O'Hara, C.** (2019). Teachers' self-perceptions of mathematical knowledge for teaching at the transition between primary and post-primary school. *International Journal of Mathematical Education in Science and Technology*. DOI: 54.5424/4464173X.6453.5923448

Prendergast, M., **O'Meara, N.**, O'Hara, C., Harbison, L., & Cantley, I. (2019). Bridging the primary to secondary school mathematics divide: Teachers' perspectives. *Issues in Educational Research*, 19(1), 243-260

**O'Meara, N., & Prendergast, M.** (2019). Teaching mathematics after hours. *Journal of Curriculum Studies*. DOI: 10.1080/00220272.2018.1535666.



National Centre for STEM Education

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