

# CHANGING THE FABRIC OF ENGINEERING IDENTITY THROUGH TEXTILE FABRICATION

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## OVERVIEW OF THE ROUNDTABLE

Why are textile fabrication processes and technologies not considered engineering activities by some of our students? By excluding these technologies, are we missing an opportunity to include more diverse cohorts in engineering? In this roundtable, we will discuss how creating a sense of belonging by using creative or non-traditional engineering activities could attract a more diverse range of students to engineering, and the technical applications of knitting and sewing in your engineering discipline.

In 2020 in response to COVID restrictions, we implemented an engineering textile fabrication module in our undergraduate mechanical engineering program. Students sewed PPE masks and tested them to elements of the P2 standard. (Petkoff, Halupka & Wordley, 2022).

In 2023, a group of our engineering Final Year Project students are “Hacking a Knitting Machine”. The students are commissioning, testing and developing inductions for two computer-controlled 1980’s Brother KH910 knitting machines and a 3D-printed circular sock machine. The students are investigating the fast-prototyping capabilities of the machines for our engineering makerspace, as well as the engineering applications of knitting.

## KEYWORDS

Engineering Identity, Fabrication, Textiles, Standards: 3, 5, 6, 7

## ACTIVITIES

In this roundtable, we will share our progress in implementing textile fabrication techniques and processes within the engineering curriculum and makerspaces. Then, together with you, we would like to brainstorm ways to incorporate textile fabrication in your courses, as well as technical applications for knitting and sewing in engineering.

The issues we are interested in discussing are:

Engineering identity:

- Where are the boundaries on what is and is not considered Engineering? What and who defines those boundaries? Have you encountered any other fabrication technologies that have been considered “not engineering?”
- How do we map the interface between engineering, textile design, wearable technologies and fashion?

Applications of knitting in Engineering:

- What are the emerging technical applications in your discipline for knitting, sewing or other textile technologies? For example, using engineered materials such as carbon

fibre or Kevlar? Are there areas where something fabricated this way would give a unique opportunity?

## TARGET AUDIENCE

Everyone is welcome at this roundtable discussion, particularly those teaching design and fabrication, operating makerspaces, or interested in hands-on skills development.

## FOLLOW-UPS

We will share course materials for mask sewing and the outcomes of the 2023 Hack a Knitting Machine Final Year Project with any interested participants. In addition, we would like to create an ongoing informal conversation through occasional virtual catch-ups.

## REFERENCES

Petkoff, K., Halupka, V., Wordley, S. (2022). Sew What? Introducing an engineering textile fabrication project. *Proceedings of the 33rd Annual Conference of the Australasian Association for Engineering Education (AAEE 2022)*. Sydney, Australia: Western Sydney University.

## BIOGRAPHICAL INFORMATION

**Veronica Halupka:** is the Education Manager of the Faculty of Engineering, Monash University. She leads a team of educational designers implementing evidence-based, leading practice approaches to Engineering Education in course design and ed tech.

**Kathy Petkoff:** is a Senior Teaching Fellow in the Faculty of Engineering, Monash University. She is instrumental in teaching engineering design in common first year, and integrated design for final year undergraduate mechanical students and final year masters students. Her research interest is in how to better equip students moving from university to industry.

**Scott Wordley:** is an Associate Professor in the Department of Mechanical and Aerospace Engineering at Monash University and is the Director of Student Teams, Clubs and Societies and of the Monash Makerspace. He teaches three core Design units.

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