

Modular Mayhem: A Playful Gateway to Mathematical Fashion Design

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In this talk, I explore how play, creativity, and modular systems can open new ways of engaging with mathematics through fashion design. Although I struggled with mathematics early in my education, encountering generative design at TU Eindhoven—particularly the work of Loe Feijs [1] and Troy Nachtigall [3]—transformed my perspective. For the first time, I realised that mathematics could be used to create beauty, not just solve problems.

Inspired by the zero-waste potential of 3D printing, I began developing modular 3D-printed garments rooted in mathematical structure. These designs focus on disassembly, repair, and mass customisation—values made possible through precise, modular systems. However, as I attempted to systematically catalogue every connection type and geometry into a giant database, I discovered that too much structure drained the creativity from the process.

To restore spontaneity and embrace the happy accidents inherent in both science and art, I created *Modular Mayhem*: a game [2] that transforms variables like base patterns, weave styles, and module sizes into playful prompts. Players navigate creative constraints by drawing cards and experimenting across increasing levels of difficulty. By blending rules and chaos, *Modular Mayhem* invites intuitive exploration of mathematical ideas—even for those who, like my younger self, once believed math had no real-world use.



Figure 1: *PerFlex*: A parametric modular 3D-printed bra, created by Brigitte Kock, Niek van Sleuwen, and Bart Pruijmboom (2017-2018).



Figure 2: Selection of modular 3D printed fabrics by @variableseams (2021-2025).

References

- [1] Loe M. Feijs. “Designing Fractal Line Pied-de-poules.” *Journal of Humanistic Mathematics*, vol. 10, no. 1, 2020, pp. 240–266. <https://doi.org/10.5642/jhummath.202001.11>.
- [2] Brigitte Kock, *Modular Mayhem: A Game for Designing Sustainable Structures*. 2025. <https://www.variableseams.com/modular-mayhem>.
- [3] Troy Nachtigall. “Towards Ultra Personalized 4D Printed Shoes.” *CHI EA '18 Extended Abstracts*, 2018. <https://doi.org/10.1145/3170427.3174369>.