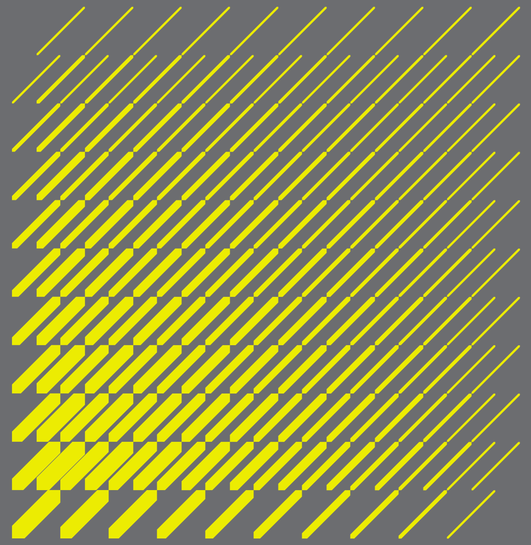
SCALES
IN TEXTILES



2025

ArcInTex
Beyond e-Textiles
Aalto University

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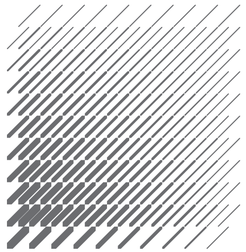

AALTO UNIVERSITY

APRIL 8-10, 2025

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ISBN 978-952-64-9668-9 (PDF)

http://urn.fi/URN:ISBN:978-952-64-9668-9

Unigrafia Oy
Helsinki
2025

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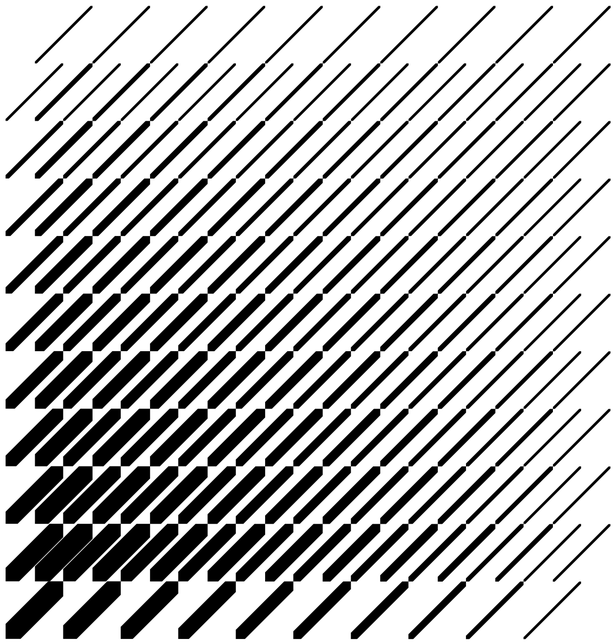

SCALES IN TEXTILES

The conference is hosted by Aalto University, bringing together the ArcInTex network and the Beyond e-Textiles project. This conference explores the multiple scales inherent in textile innovation - whether through physical scales, from nanomaterial manipulation and fiber development to the integration of textiles into wearable technologies and extensive IoT systems, or through temporal scales, as we rethink material life cycles and longevity. It also challenges us to reflect on the balance within our research choices: how we weigh and prioritize competing needs, and how we bring together perspectives that range from the generalisable to the deeply personal.

ArcInTex

ArcInTex is a network where Architecture, Interaction Design and Textiles join forces in developing ideas, techniques, methods and programs for new perspectives on design for building, dwelling and living and do so through joint research projects, joint applications for funding larger projects, exchange programs on the Master and research levels, and joint conferences and workshop on emergent topics.

Beyond e-Textiles

Beyond e-Textiles is a Nordic network on smart light-conversion textiles beyond electric circuits. The project aims to unlock the full commercial potential of smart textiles by opening up ways for light-powered textiles that can find uses, for instance, as sunshine-based dry cleaning or disinfecting of clothes, UV-powered water purification nets, light-collecting tents, and incident irradiation adaptable window shades/curtains. Overall, our goal is to bring together critical mass and to form a network to serve particularly Nordic industries that could benefit from progress in smart textiles. Moreover, we aim to enhance Nordic integrity in exchanging the best practices of teaching design thinking, as well as facilitating interdisciplinary collaboration between scientists, engineers, designers and artists.

BEYOND E-TEXTILES: SOLAR ENERGIES AS AGENTS FOR CHANGE IN SMART TEXTILE DESIGN

ERIN LEWIS

University of Borås

Erin Lewis, Ph.D., is a Senior Lecturer and Researcher in Textile Interaction Design at the Swedish School of Textiles, University of Borås, Sweden. Her research focuses on developing sensing methods and tools for detecting non-visible phenomena in smart textiles, as well as on the experimental application of AI in textile design processes. Erin integrates her media art and electronic design expertise to create novel interactive approaches in smart textiles.

Moving beyond the conventional understanding of solar energy as a power source, this presentation will discuss the constituents of solar energies and their capacity to act as an agential material, i.e. one that interacts, mediates, and facilitates change in smart textile designs. The concept of agential materiality suggests that phenomena such as solar energies are not passive forces but are active participants in the co-constitution of natural and designed environments. Solar energies comprise sunlight and its constituents: visible light (through which we experience illumination and colour), ultraviolet (UV) wavelengths, and infrared wavelengths. These each contain inherent variabilities in their qualities, expressions, intensities and temporal patterns that can directly influence textile material properties and the interactive and responsive aspects of smart textile design. This perspective draws from a ‘more-than-human design’ theoretical framework, which argues for the recognition of non-human actors in the design process. Through this lens, solar energies inform the properties, behaviours, and expressions of textile design materials and challenge conventional hierarchies between the animate and the inanimate.

When exposed to solar energies such as UV wavelengths of varying intensities and temporalities, textiles become sites of change in ways that are both qualitative and observable, ranging from subtle variations in colour and luminosity to behaviours responsive to environmental conditions. The co-creation of this state draws in part from the solar energies that act upon the textile material and also the constituents and design of the textile material through which imperceptible solar constituents are made perceptible, such as UV colour-changing, illuminating, and shape-changing yarns. The textile becomes a site for agential interaction wherein the expressions change in relation to the presence of solar energies. Factors such as sunlight intensity, UV levels, exposure duration, material composition, textile structure, use, and placement all contribute to the inherent uncertainty and unpredictability of the interaction. Furthermore, this demonstrates the potential for textiles to act as an interface between technology and natural systems and blurs the boundaries of conventional textile design objects and natural phenomena. Such textiles can be considered as active participants in a feedback loop that continuously informs their behaviours, expressions, and aesthetics.

Additionally, solar energies operate across multiple temporal scales, from the daily cycles of sunrise and sunset to the extended periods of seasonal change, not withholding the nuances of use. These concurrent temporalities introduce a layered complexity into the material behaviour of textiles. A textile may have rapid, short-lasting, ephemeral responses throughout the day -as the sun moves between the clouds, for example- and from day to day as the weather and UV radiation changes throughout a week or a month. Additionally, seasonal shifts may intensify responsivity in spring and summer while muting it in fall and winter, depending on location. As such, designers working with solar energies may adopt approaches where concurrent temporalities can be expressed by capturing both the ephemeral moments and longer cycles of change.

Designing with solar energies is an act of embracing uncertainty and unpredictability. Through the integration of dynamic elements of natural phenomena into the textile design process, designers can expand the material, interactive, and responsive possibilities of smart textile design, opening to new expressions and aesthetics and revealing their material entanglements when synched with the rhythms of the natural world.