# Computational Pattern Making from 3D Garment Models 

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Fig. 1. Our technique receives a 3D mesh of a given garment as input, automatically segments the shape into patches (left and middle) and computes the 2D parametrerization required to produce a pattern (right) that can be cut out and sewn to fabricate the actual garment.

We propose a method for computing a sewing pattern of a given 3D garment model. Our algorithm segments an input 3D garment shape into patches and computes their 2D parameterization, resulting in pattern pieces that can be cut out of fabric and sewn together to manufacture the garment. Unlike the general state-of-the-art approaches for surface cutting and flattening, our method explicitly targets garment fabrication. It accounts for the unique properties and constraints of tailoring, such as seam symmetry, the usage of darts, fabric grain alignment, and a flattening distortion measure that models woven fabric deformation, respecting its anisotropic behavior. We bootstrap a recent patch layout approach developed for quadrilateral remeshing and adapt it to the purpose of computational pattern making, ensuring that the deformation of each pattern piece stays within prescribed bounds of cloth stress. While our algorithm can automatically produce the sewing patterns, it is fast enough to admit user input to creatively iterate on the pattern design. Our method can take several target poses of the 3D garment into account

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[^0]and integrate them into the sewing pattern design. We demonstrate results on both skintight and loose garments, showcasing the versatile application possibilities of our approach.

CCS Concepts: • Computing methodologies $\rightarrow$ Computer graphics; Shape modeling; Mesh geometry models.

Additional Key Words and Phrases: pattern making, cloth parameterization, patch layout, garment fabrication

## ACM Reference Format:

Nico Pietroni, Corentin Dumery, Raphael Falque, Mark Liu, Teresa VidalCalleja, and Olga Sorkine-Hornung. 2022. Computational Pattern Making from 3D Garment Models. ACM Trans. Graph. 41, 4, Article 157 (July 2022), 14 pages. https://doi.org/10.1145/3528223.3530145

## 1 INTRODUCTION

In this work, we propose a method for automatically creating a sewing pattern for a given 3D model of a garment.

In the fashion industry, the garment creation process starts from the 2D domain: The pattern maker creates the 2D sewing pattern using traditional, often tacit knowledge [Chen 1998], established templates and a few standard measurements, such as waist circumference, shoulder width, etc. The cut fabric pieces are then sewn together to form the garment. Designers may work with mannequins to experiment with the desired shape and draping of the fabric in the physical 3D space, but the ultimate determination of the garment shape comes from the 2D pattern. Also, in digital garment design


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    0730-0301/2022/7-ART157
    https://doi.org/10.1145/3528223.3530145

