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3D digital technologies: Sculpting, modelling & construction of patterns for costume & clothing

Andrew Taylor, Dr. Ertu Unver , Barry Armstrong,
Geoff Ward, Alison Agnew, Daniel Hughes-McGrail,
Argyroulla Argyrou.

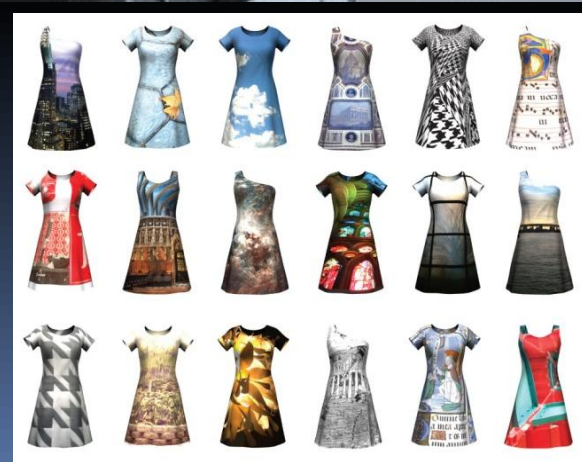
University of Huddersfield, UK
Assyst Bulmer & Optitex.

**CREATIVE CUT: THE FIRST
INTERNATIONAL SYMPOSIUM FOR
CREATIVE PATTERN CUTTING**
University of Huddersfield, UK
6 -7th February 2013

Overview of transdisciplinary project:

University TALI funded project _ Phase 2.

- **The research questions for the project:**
 - What educational value can 3D digital technologies add to established 2D CAD programs and traditional methods in Textiles, Surface, Costume, and Fashion Design education ?
 - What innovative Learning and Teaching approaches and experiences are needed to encourage and support effective, engaging and transformative appropriate uses of 3D digital technologies in Textiles and Fashion ?
- **Project Outcomes:**
 - Explored, Evaluated and Integrated a diverse range of 3D technologies and techniques for textiles, surface, craft, costume & fashion design.
 - Researcher & industry practitioner learning experiences
 - Student authored Blog recording reflective learning and methodologies using 3D technologies.
 - Conference Presentations & Journal publication.
 - *Project team includes:*
 - Academics in Textiles & Fashion design, 3D Digital design academics, postgraduate research students and industry partners.

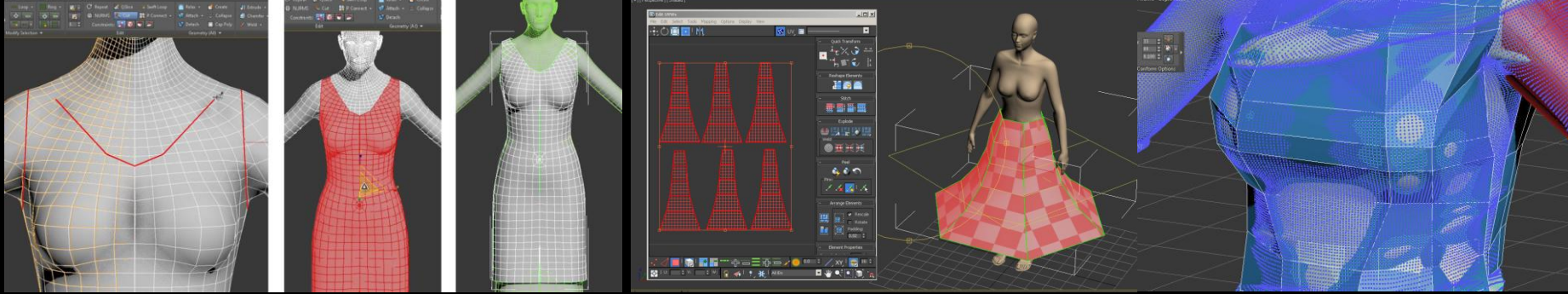


3D Digital Design Research:

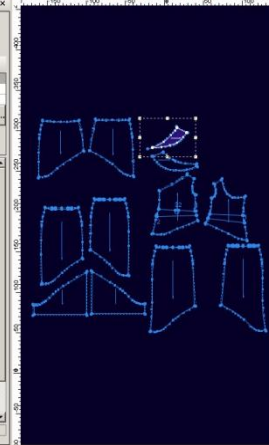
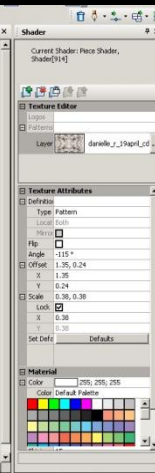
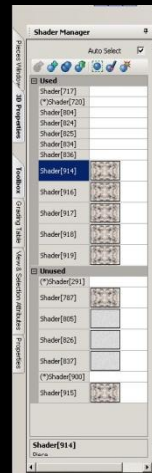
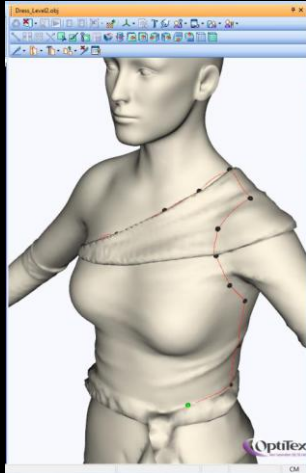
3D character, digital sculpture, modelling and costume design



MA Postgraduate Dan Hughes McGrail portrayal of Sir Patrick Stewart as Elizabethan Francis Bacon.



3D modelling & Pattern design development with virtual model in 3DS Max, Mudbox & parametric model in Optitex



Pattern design development, toile making and fitting with support from sample technician & student fit model.

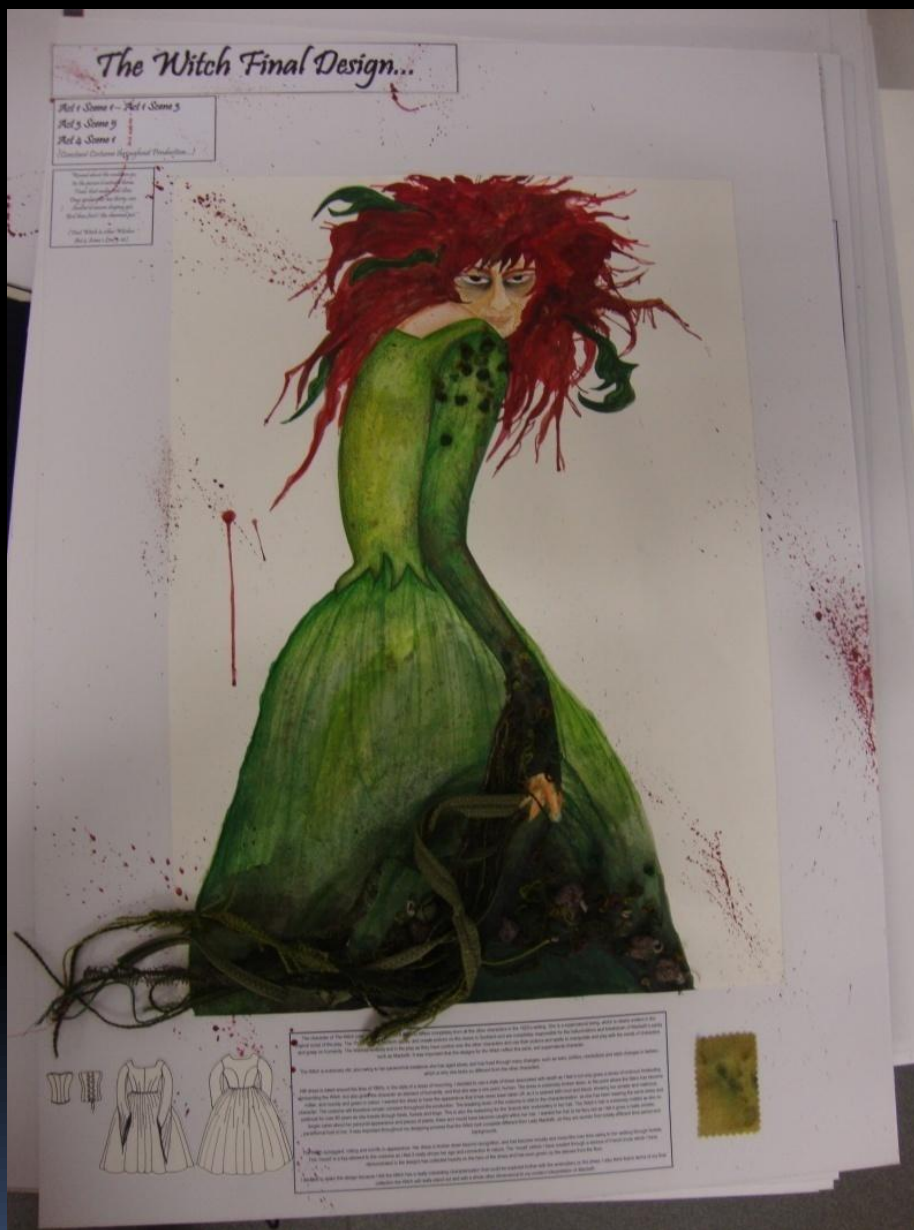




BAZ ARMSTRONG: MA by Research student - University of Huddersfield
& Lecturer in BA (Hons) Digital Games Art Production

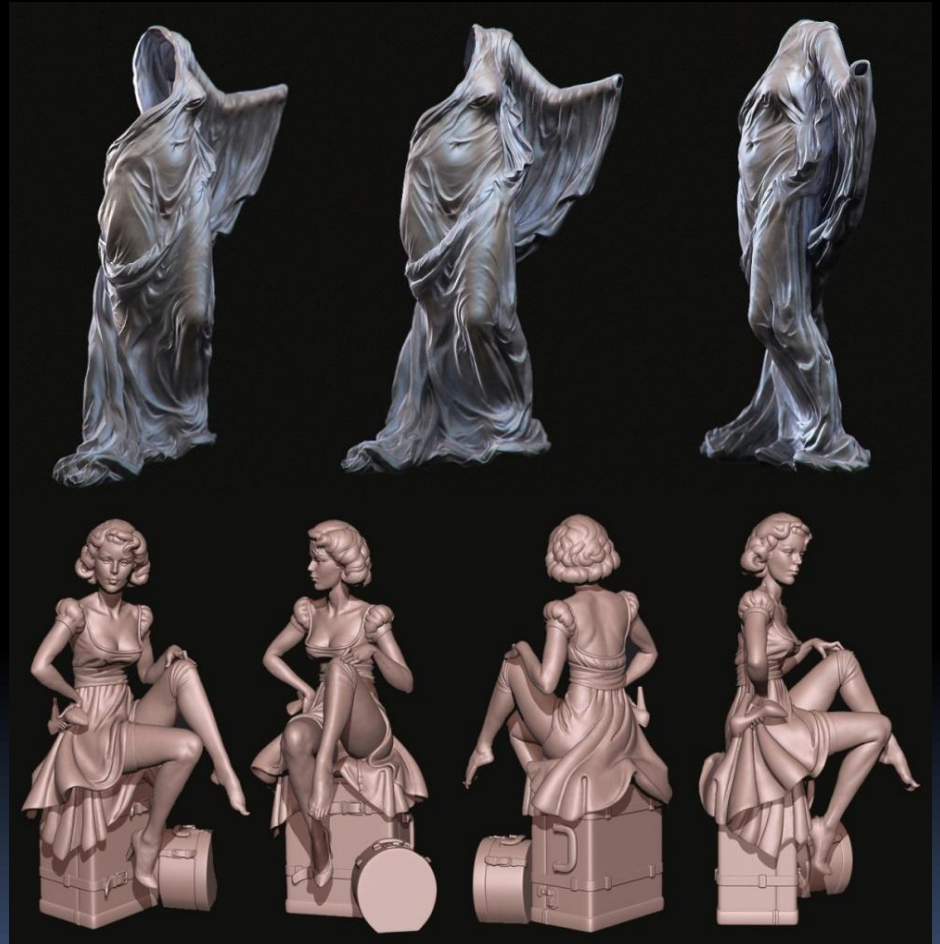


Games Art : Games character designs and digital models



Peer observation opportunity: Identified similarities between the design and production workflow of Costume designers and video game artists.

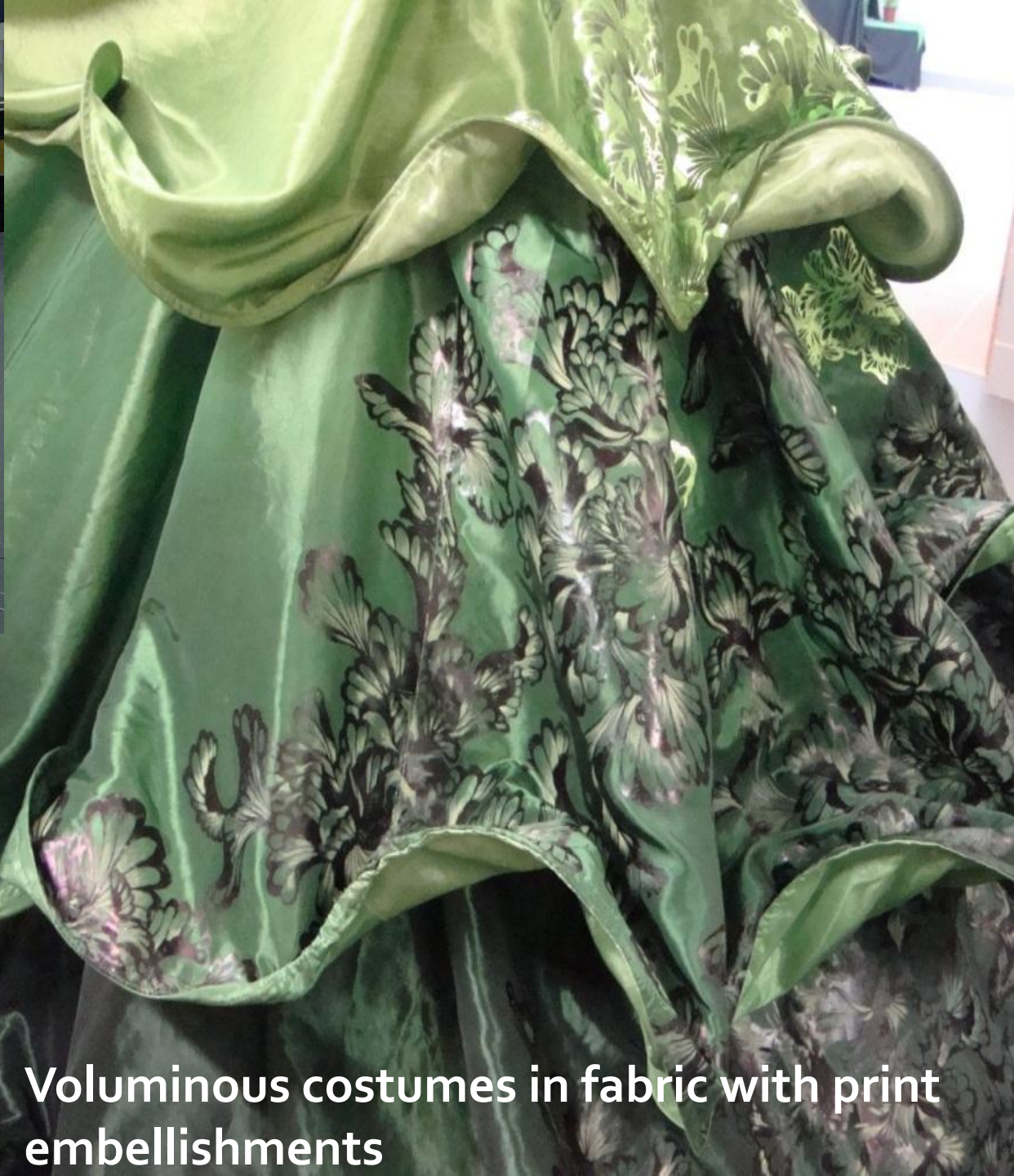
Digital 3D sculpture for costume design visualisation



Digital sculpture tools are commonly used in the film, video games and product manufacturing industries



Autodesk Mudbox: Sculpture tools and methods explored during research drawing & modelling experiments

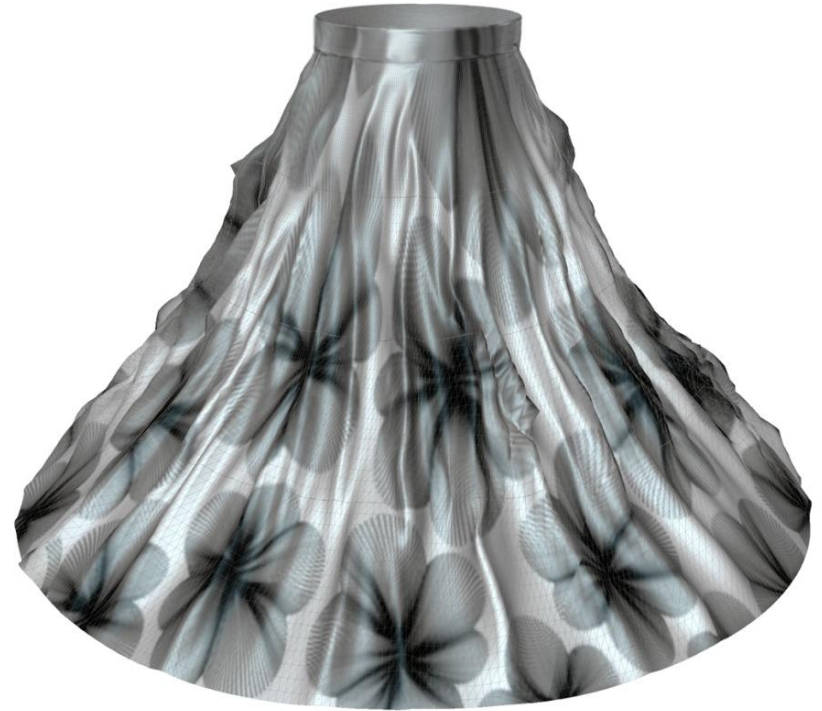
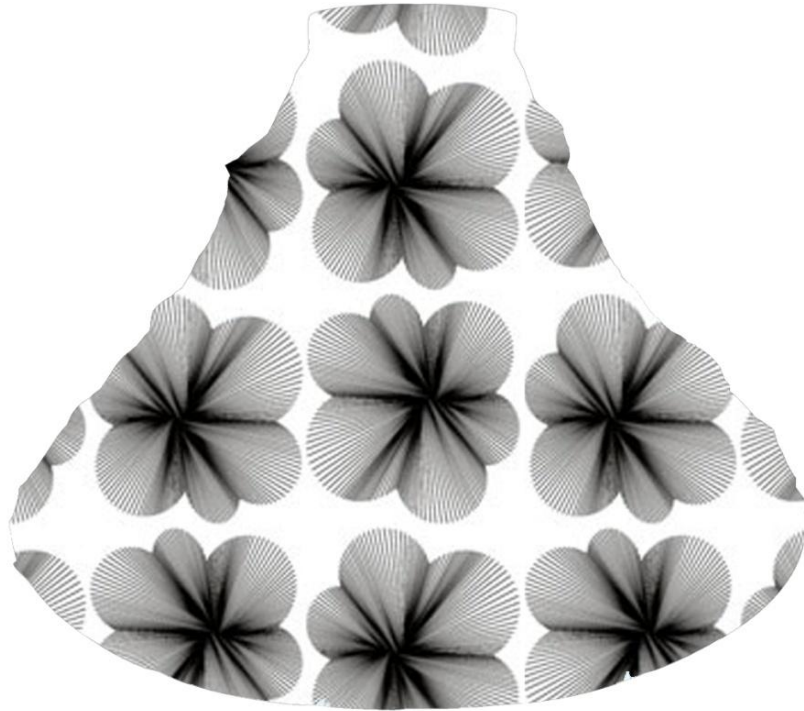


Voluminous costumes in fabric with print embellishments

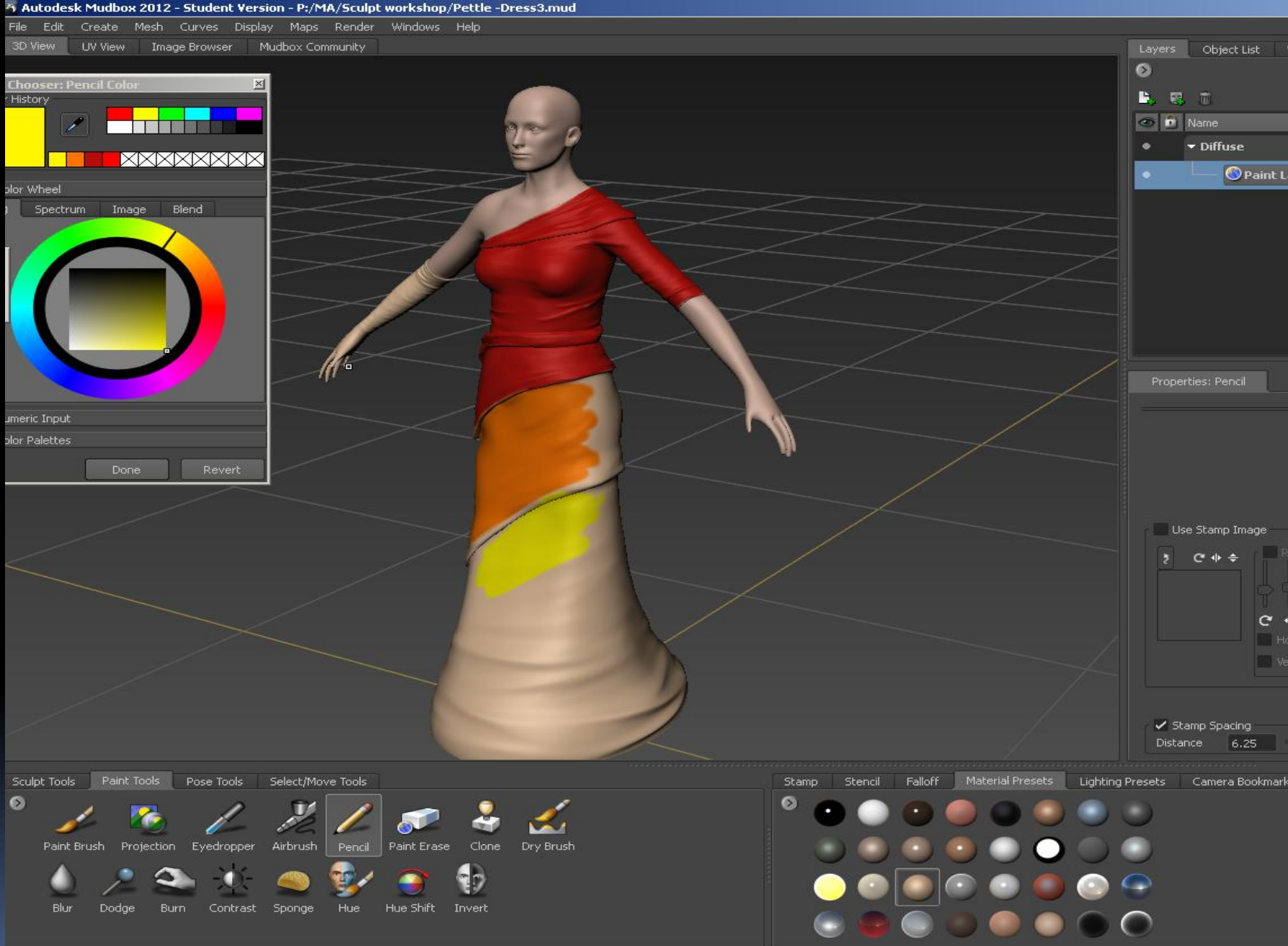


Sculpting a voluminous costume elements in Mudbox:

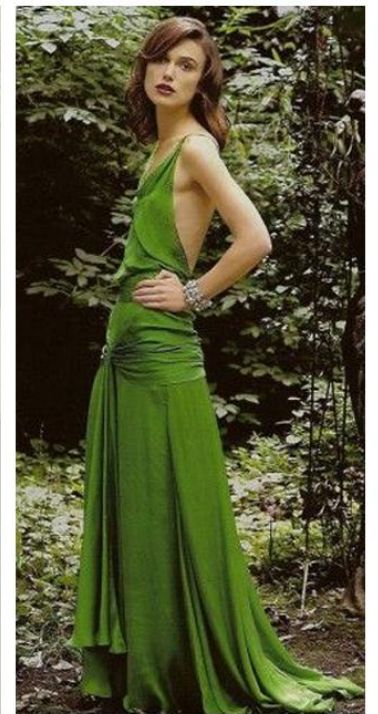
FLikr sculpting video: <http://www.flickr.com/photos/bazarmstrong/>



2D 'traditional' image texture v Painting Pattern on 3D digital surface



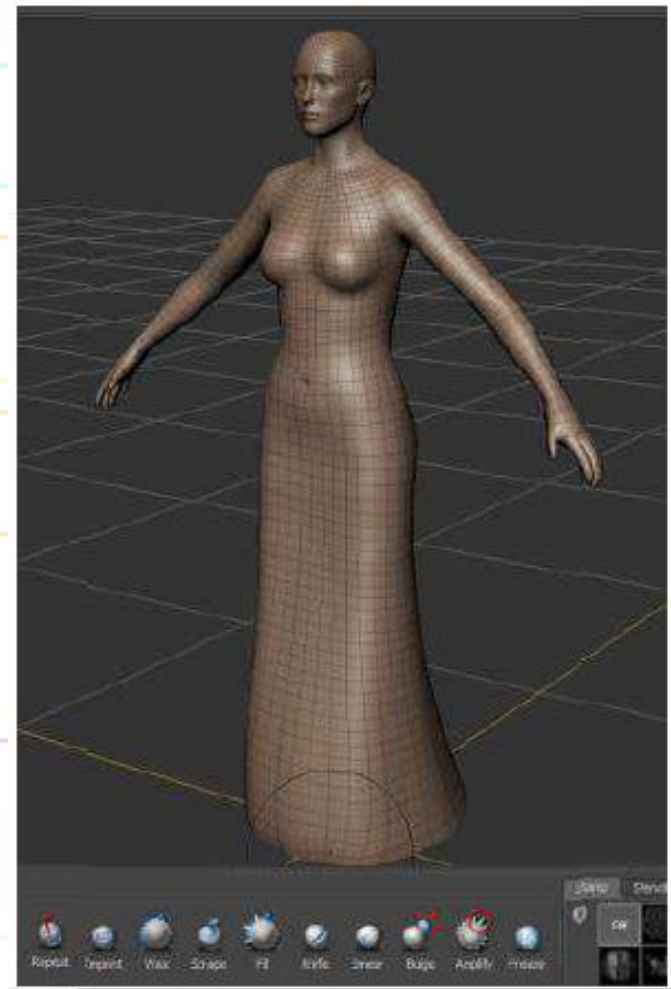
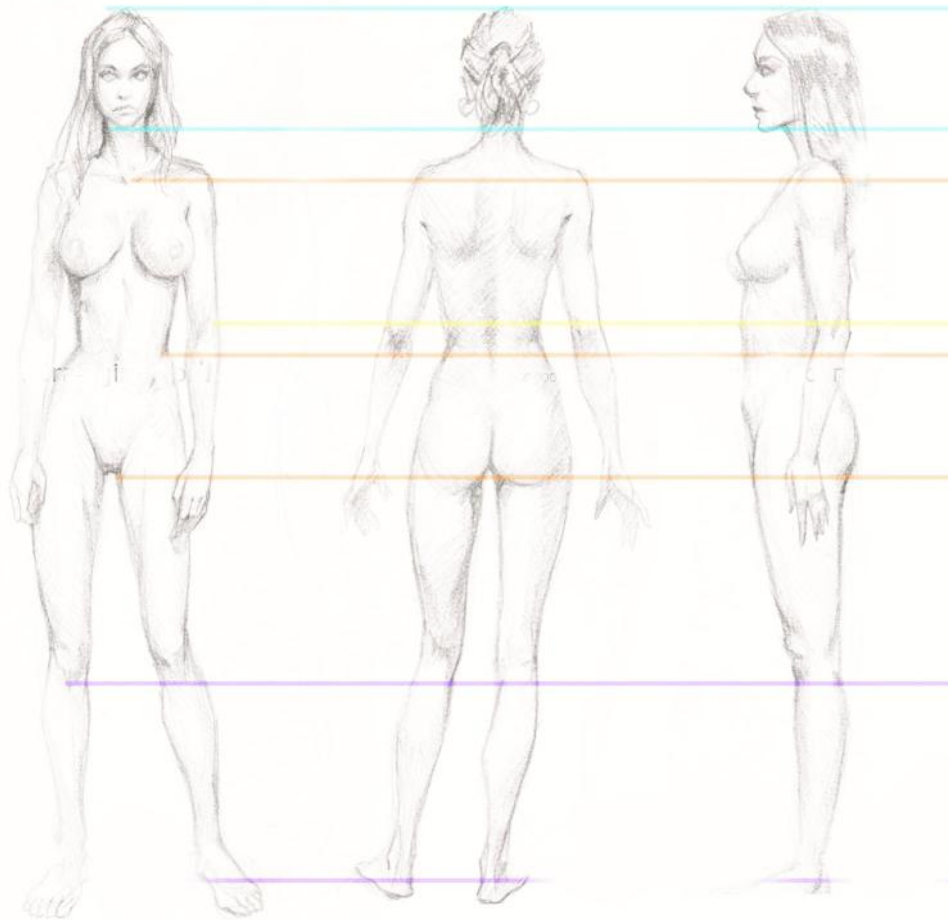
Painting onto the digital sculpture/illustration



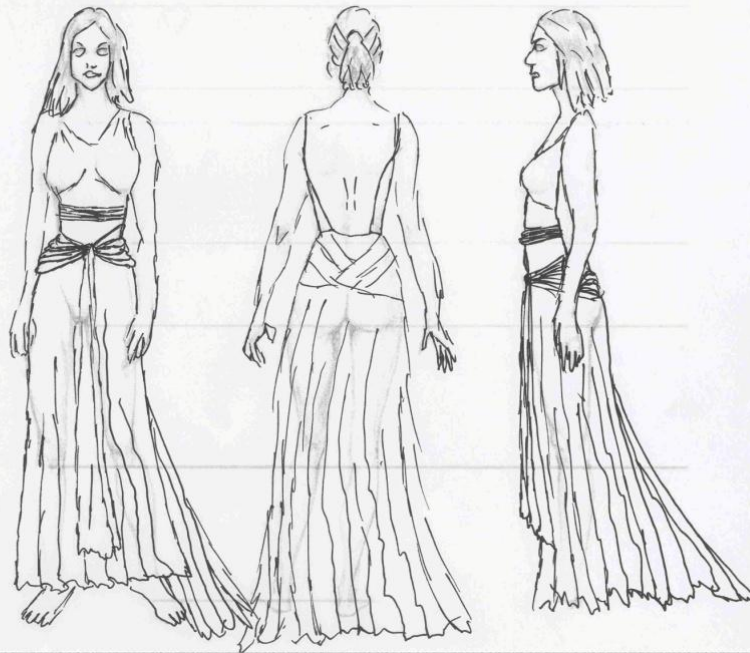
Jacqueline Durran's 'Atonement' Dress used as a control design

BA (Hons) Costume sculpture Year 2: MA Research



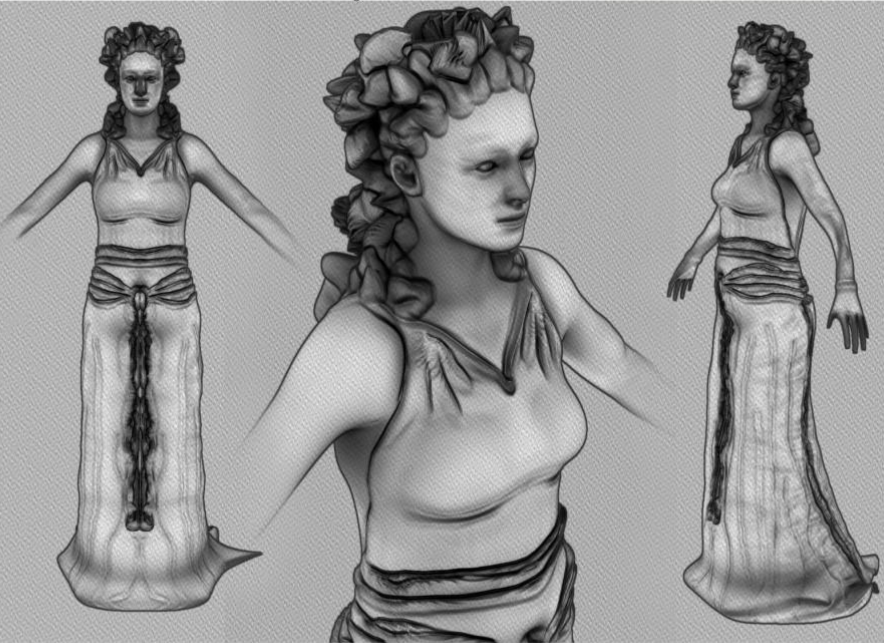


Research drawing templates for students
in costume sculpture workshop



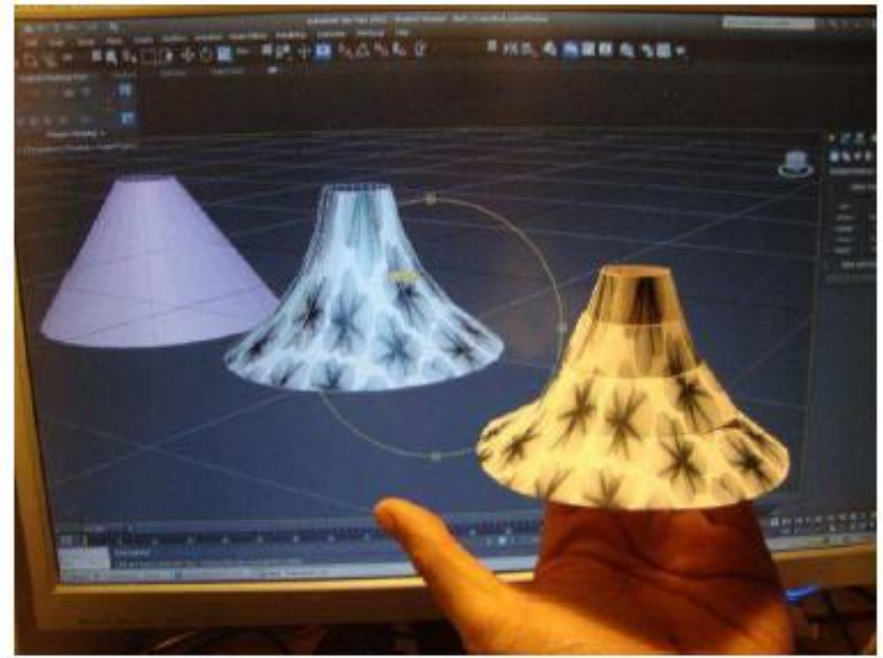
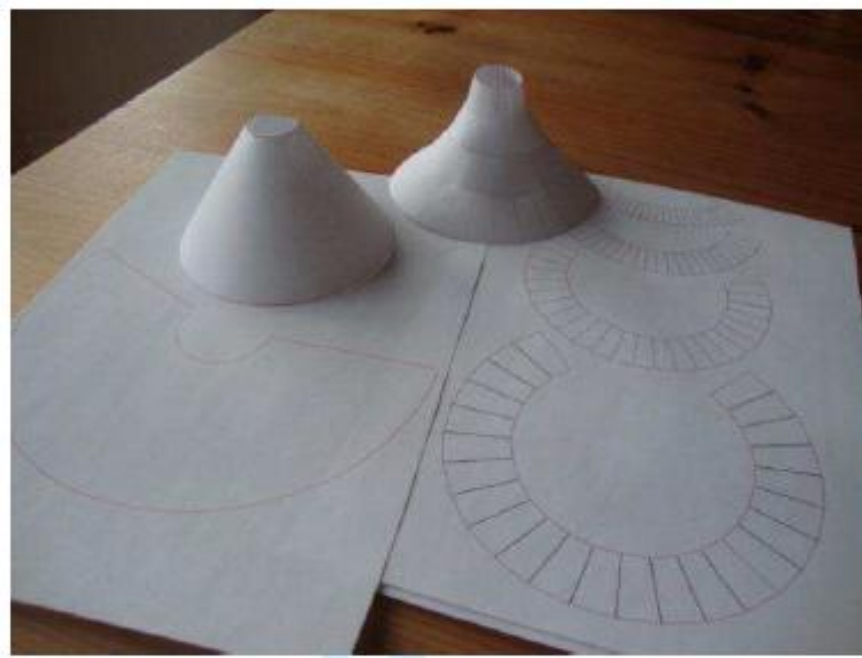
Costume Design student's hand-drawn illustrations in sketchbook

Designer #7

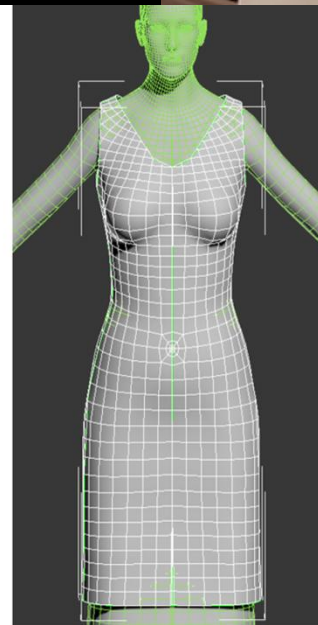
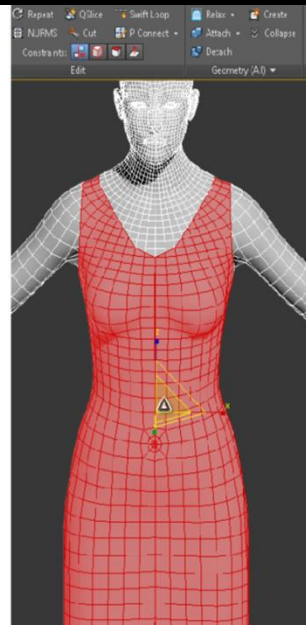
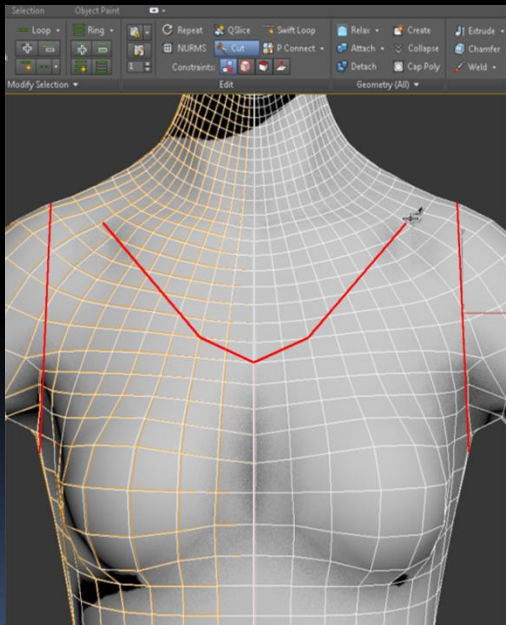
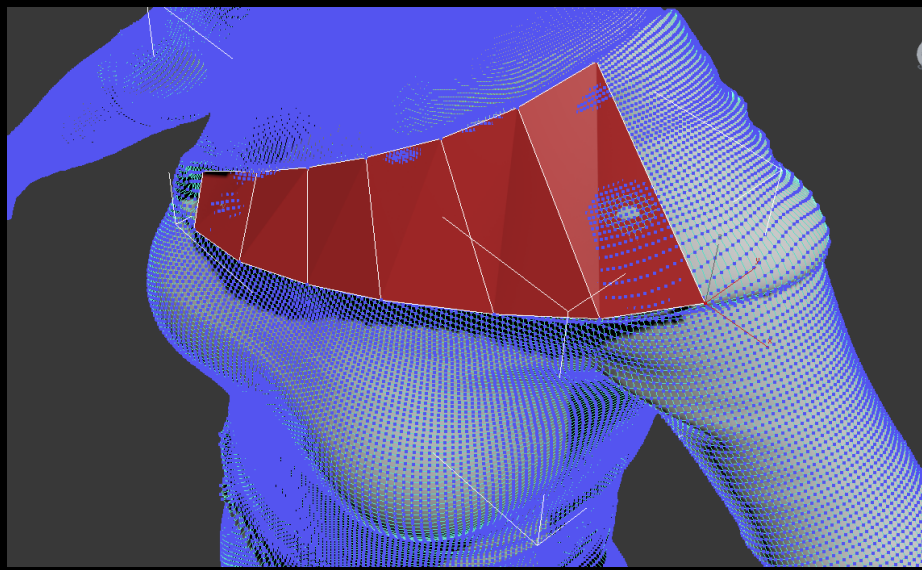


Costume Design Student's Digital 3D illustrations In Autodesk Mudbox

Phase 1: Exploratory research presentation at the
Postgraduate research symposium-
School of Art, Design & Architecture

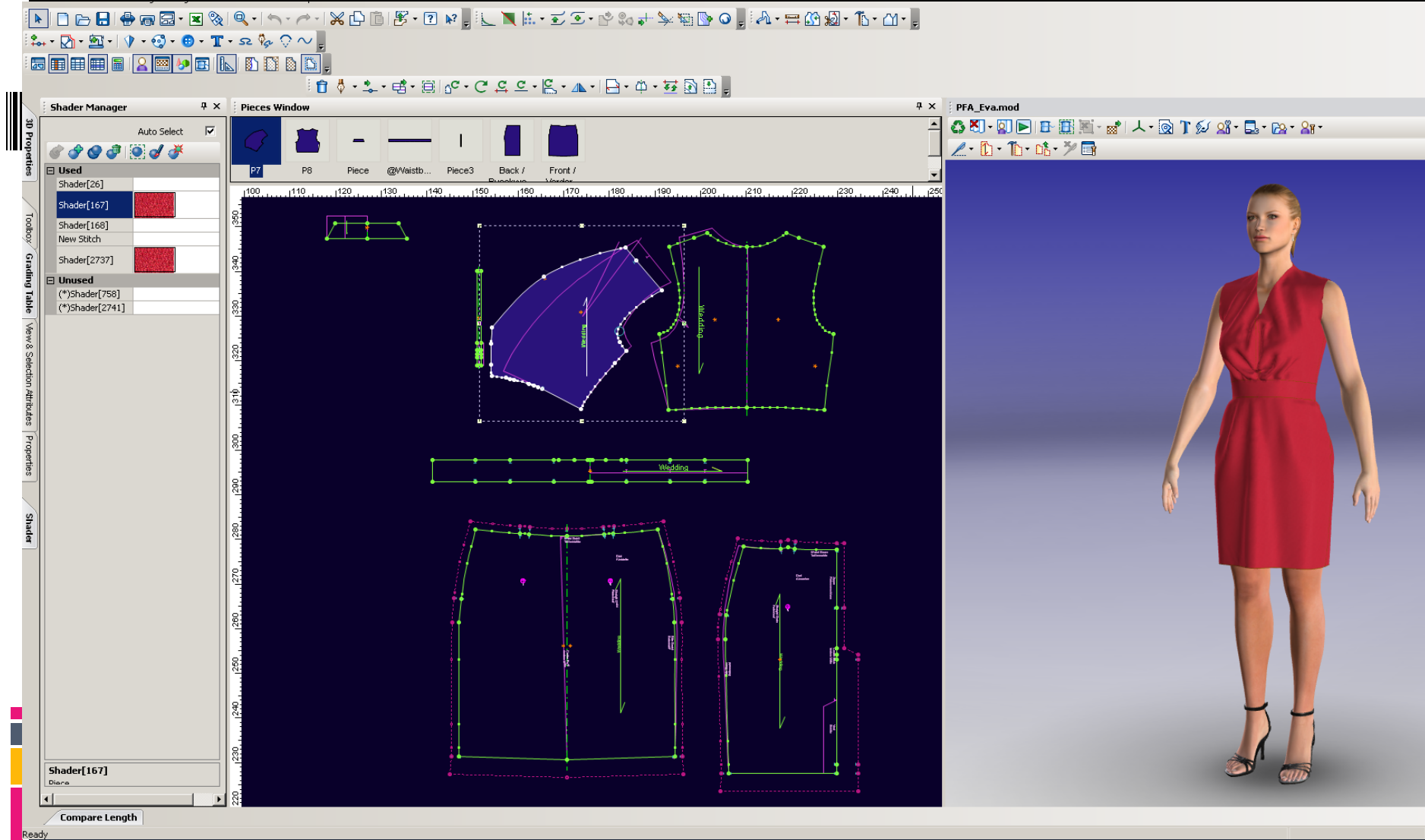


Can video game production tools be used create
makeable patterns for clothing ?

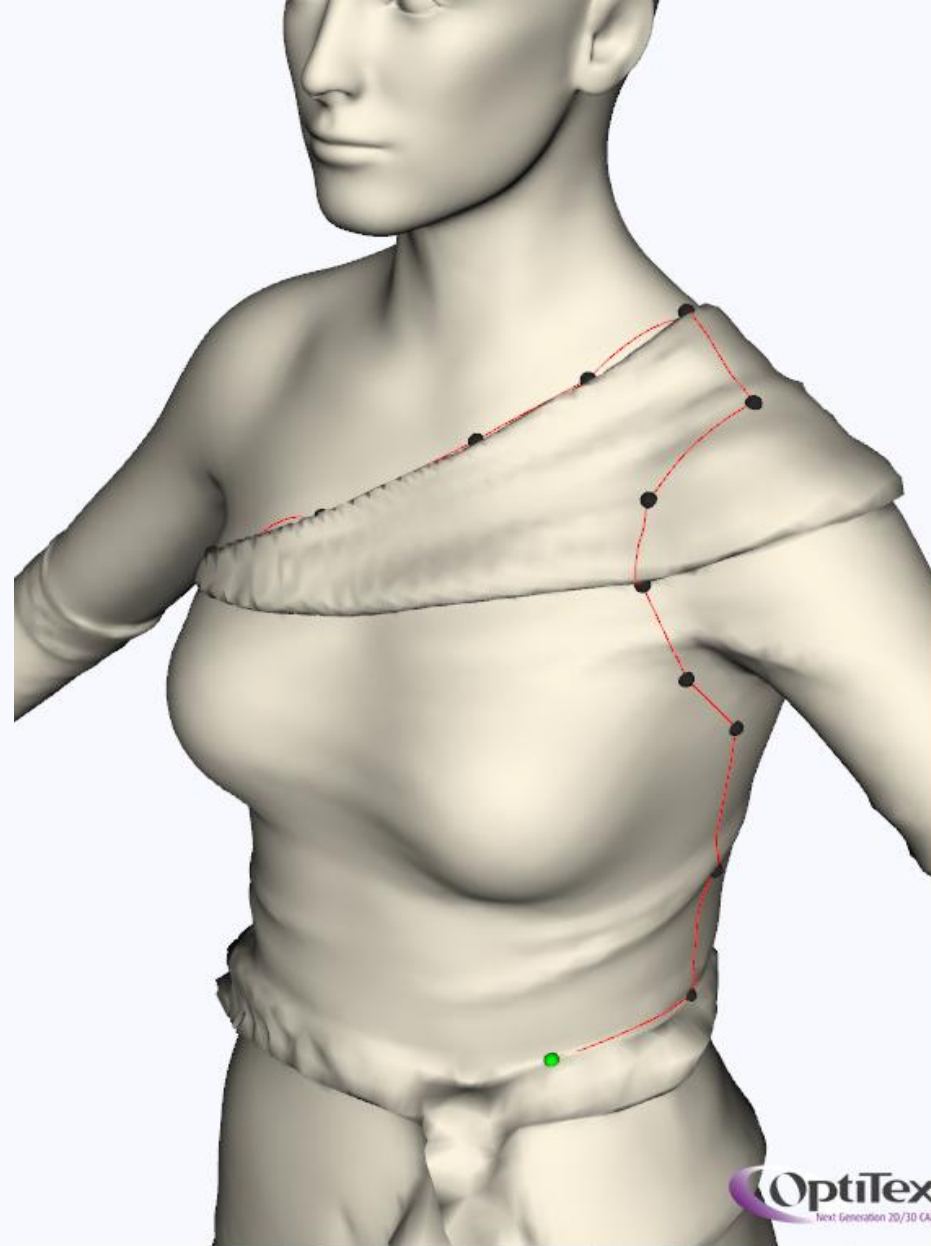
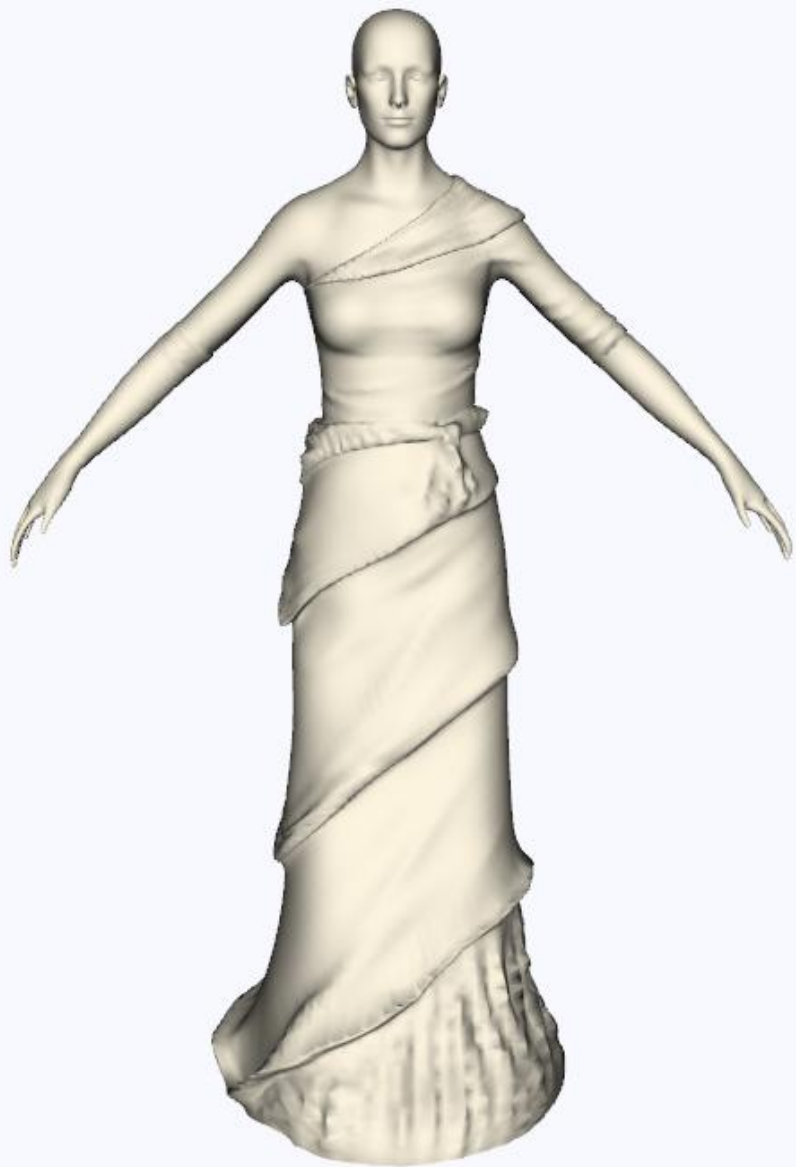


Liz Garland
Costume Technician & Designer

Exploratory research found overlapping methods and practice between games production and costume design sculpting cloth and working on the stand.

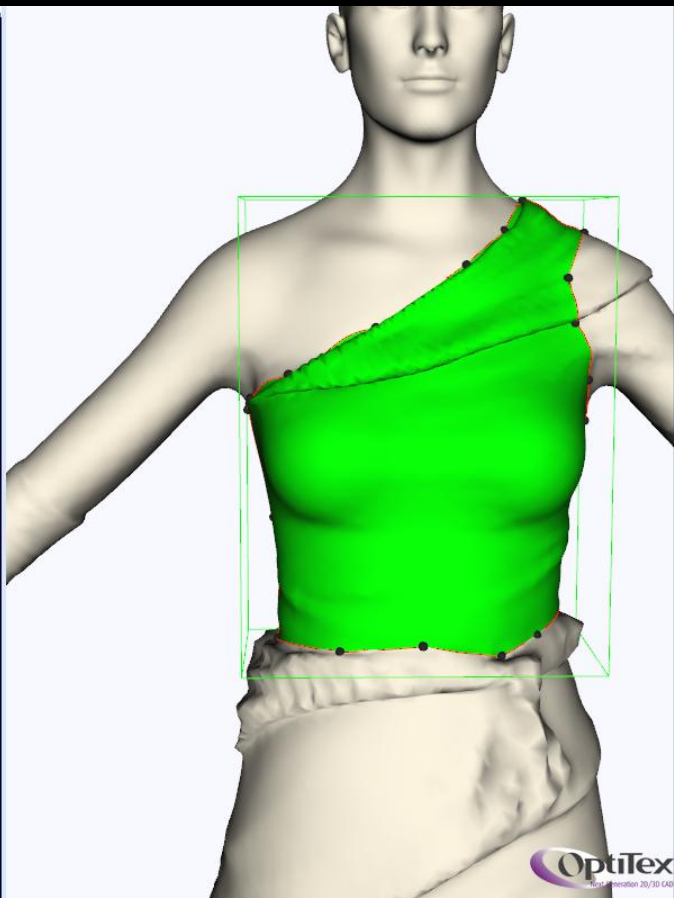
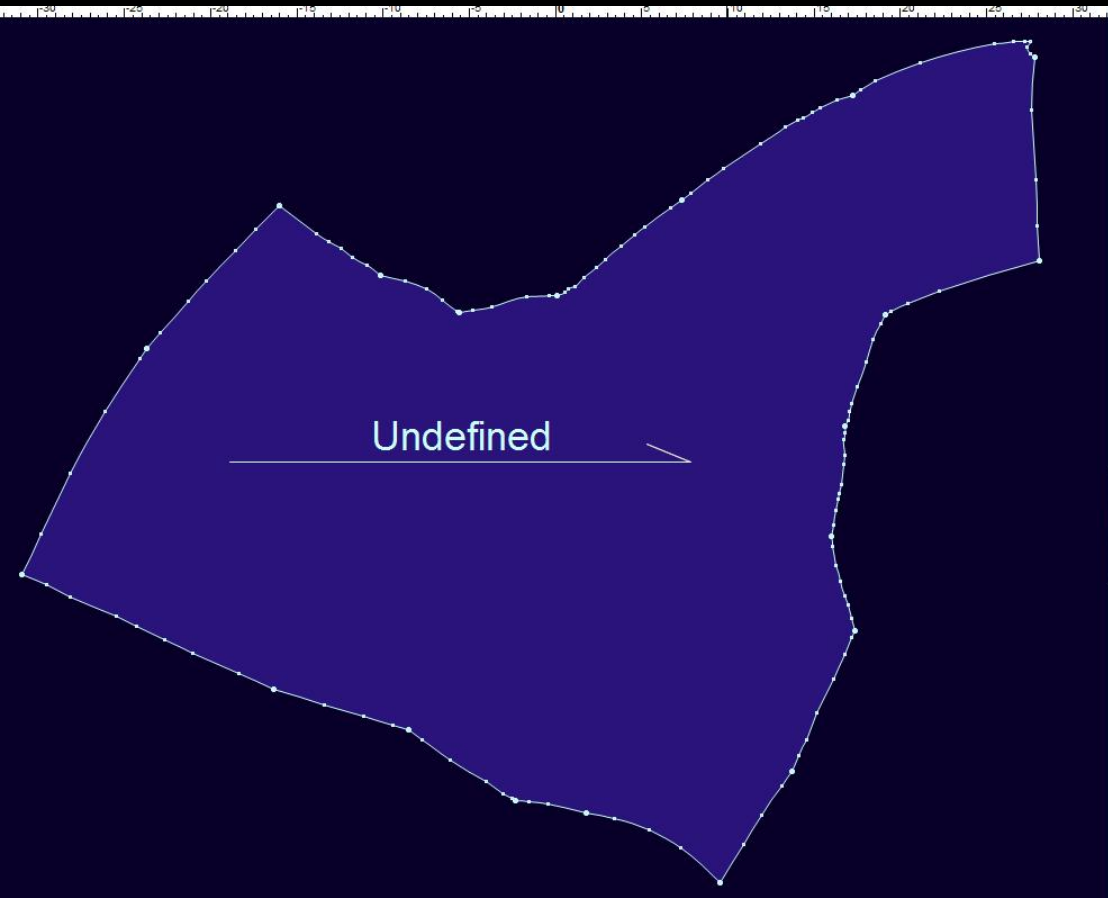


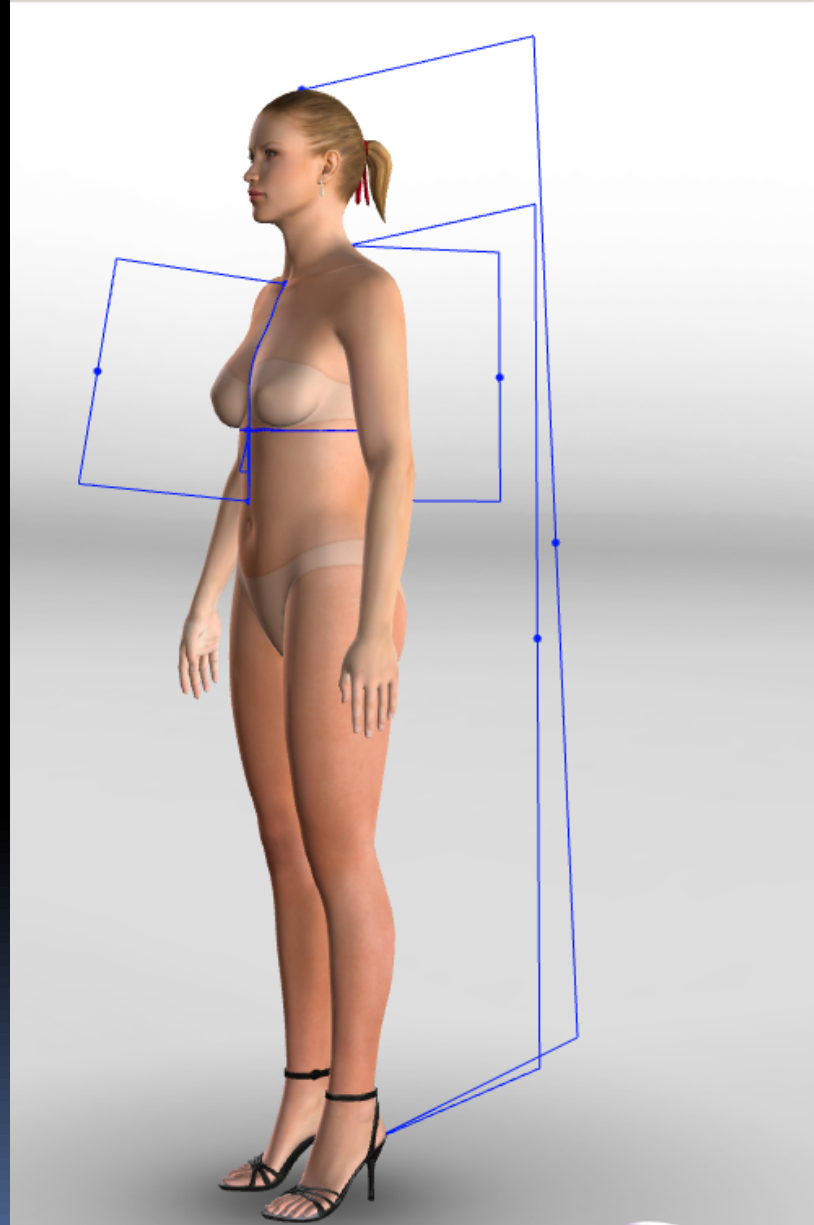
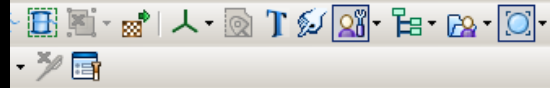
ASSYST BULLMER & OPTITEX - GEOFF WARD:
3D pattern design and garment construction



1. 3D digital illustration imported into Optitex

2. Drafting bodice pattern in Optitex





Model Properties

[-] Morphs	Size[underbu	76.26
[-] Basics	Size[unde	
Length	Height	167.72
Circuml	Cervical Heig	143.87
Bust	Body Depth	18.85
Pose	Body Dep	
Face	Body Width	26.56
[-] Props	Weight Balar	
FootW	Posture	
Socks	Muscles	
Hair	Arms Mass	
Should	Trapezius	
Enviror	Seat Promine	
Access	Upper Boby I	
Misc	Belly[Pregna	17.73
	Belly Shape	
	FrontRise Vo	
	Buttocks Bun	
	Buttocks Hei	
	Buttocks Typ	
	Widest Hips	
	Widest Hips I	
	Mid Hips	
	Crotch Shap	
	Front Thigh C	
	Back Thigh C	
	Back Waist L	41.22
	Front Waist I	34.8

Parametric Female: Eva (Bust Edition)
Version: 01082011

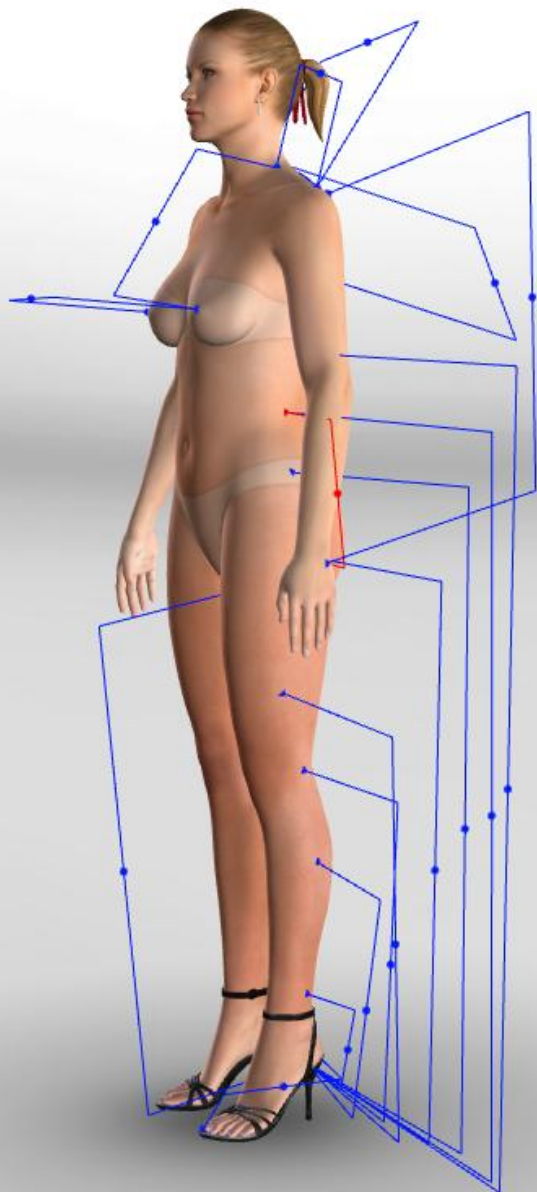
Display

Full display

All display

Clear Display

Place measure Restore Restore All



+	Shoulder Slo	4.68
+	Cross Shoulc	37.56
+	Bust Height	22.13
+	UnderBust H	114.02
+	OutSeam	104.89
+	Inseam	76.5
+	Hip Height	83.26
+	High Hip Heig	95.71
+	Knee Height	49.12
+	Low Thigh Hk	61.75
+	Calf Height	34.42
+	Ankle Height	12.54
+	Armscye Dep	17.96
+	Waist to Hips	21.47
+	BustPoint to	18.64
+	FootLen	22.85
+	Arms Lenght	57.76



Parametric Female: Eva (Bust Edition)
Version: 01082011

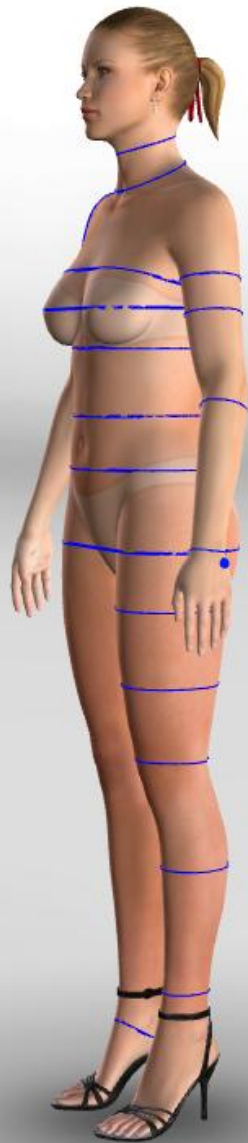
Display

Full display

All display

Clear Display

Place measure Restore Restore All



Model Properties

Morphs	UnderBust	76.26
Basics	Waist	69.65
Length	Hips	96.74
↳ Circum	Bust	92.23
Bust	Over Bust	86.48
Pose	High Hips	84.2
Face	Thigh	54.04
Props	Knee	35.98
FootWi	Low Thigh	46.77
Socks	Calf	35.51
Hair	Ankle	20.81
Should	Foot Instep	26.96
Enviro	Armscye	44.76
Access	Biceps	25.02
Misc	Upper Biceps	26.4
	Elbow	23.93
	Wrist	13.97
	Neck	29.56
	Base Neck	39.75

Parametric Female: Eva (Bust Edition)
Version: 01082011

Display

Full display

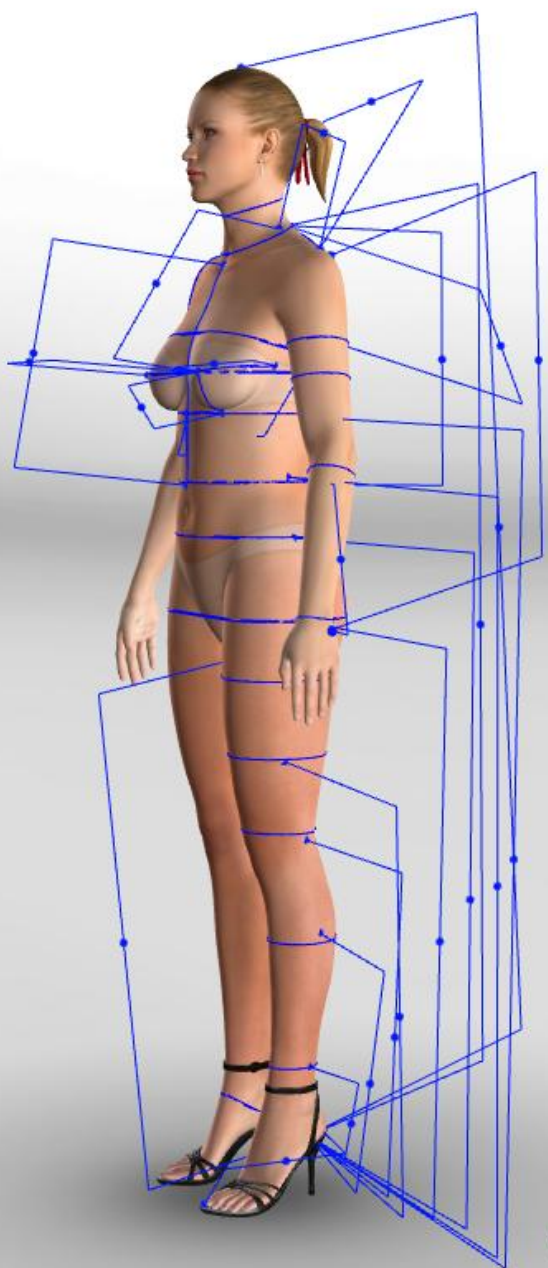
All display

Clear Display

Place measure

Restore

Restore All



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Basics	Waist	69.65
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Parametric Female: Eva (Bust Edition)
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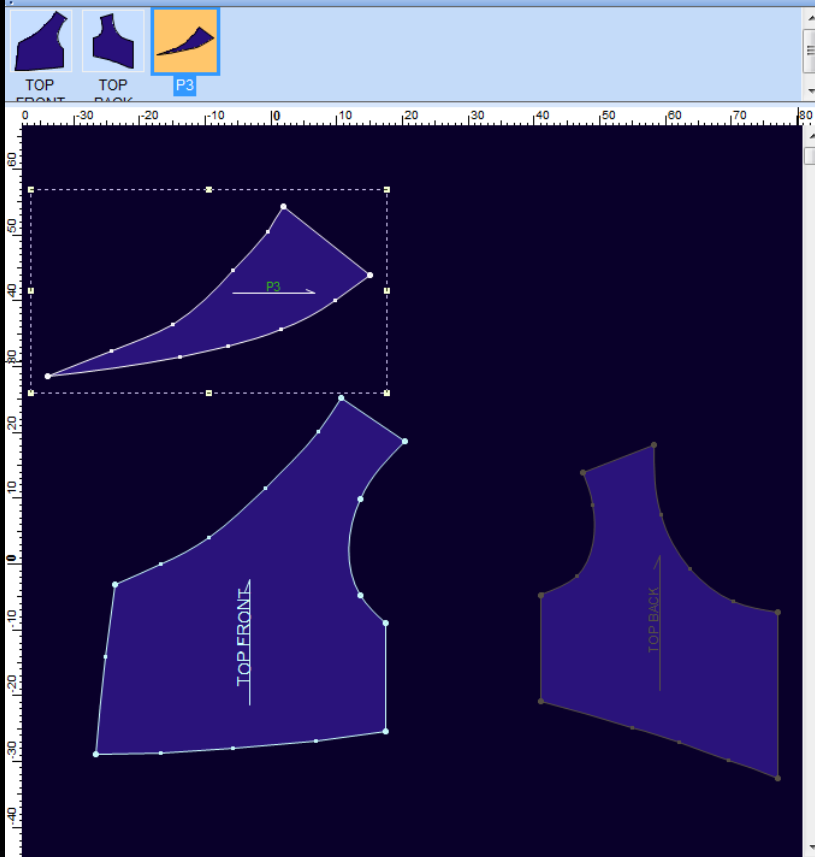
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Full display

All display

Clear Display

Place measure Restore Restore All



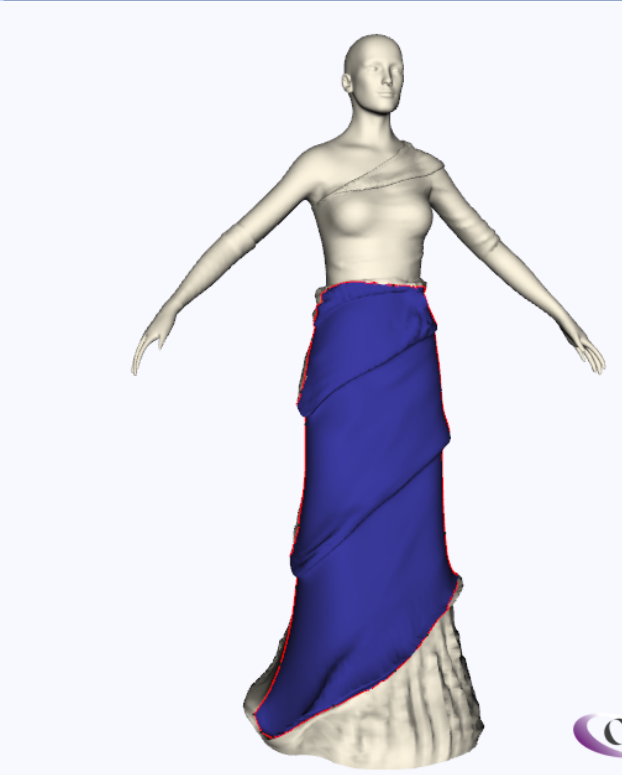
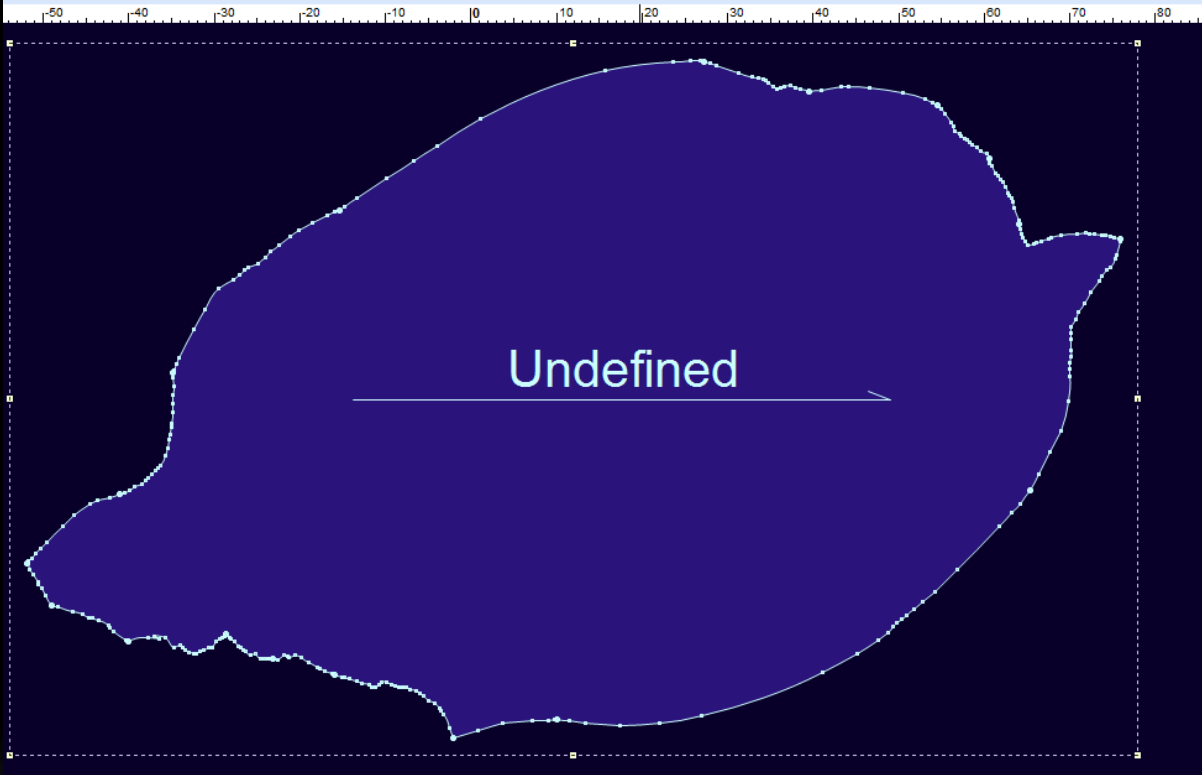
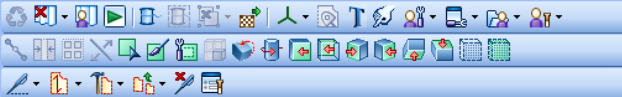
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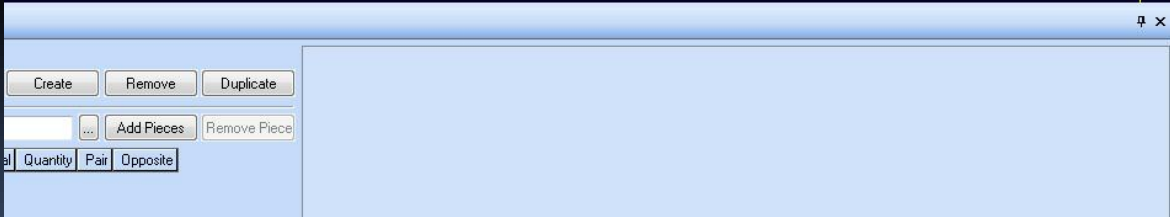
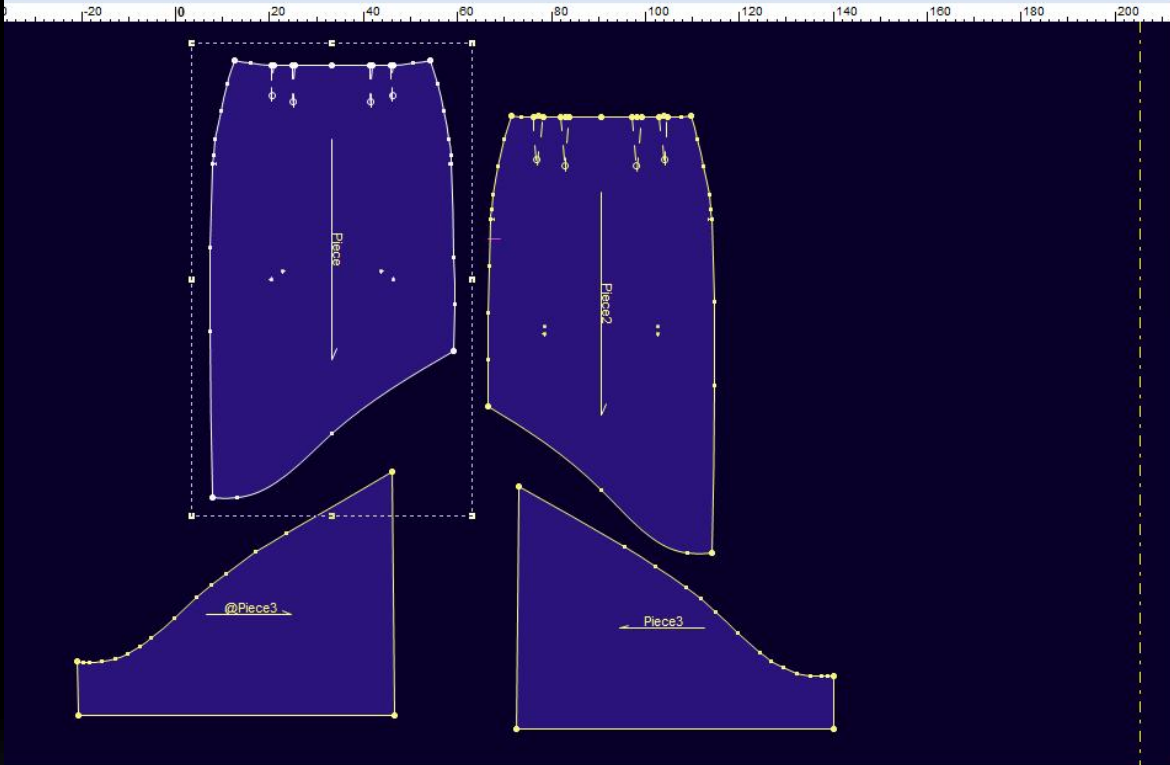
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Location	Front
Shape	Flat
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Resolution	1 cm
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Fabric Parameters	
Fabric List	C:\Program Files (x86
Select Fabric	Unknown Fabric Typ
Bending	500; 500 dyn*cm
Stretch	1000; 500 gram-force
Shear	300 dyn/cm
Friction	0.01
Thickness	2 cm
Weight	180 gr/m^2
Shrinkage	0; 0 %
Pressure	0 psi
Set Defaults	Defaults



indow

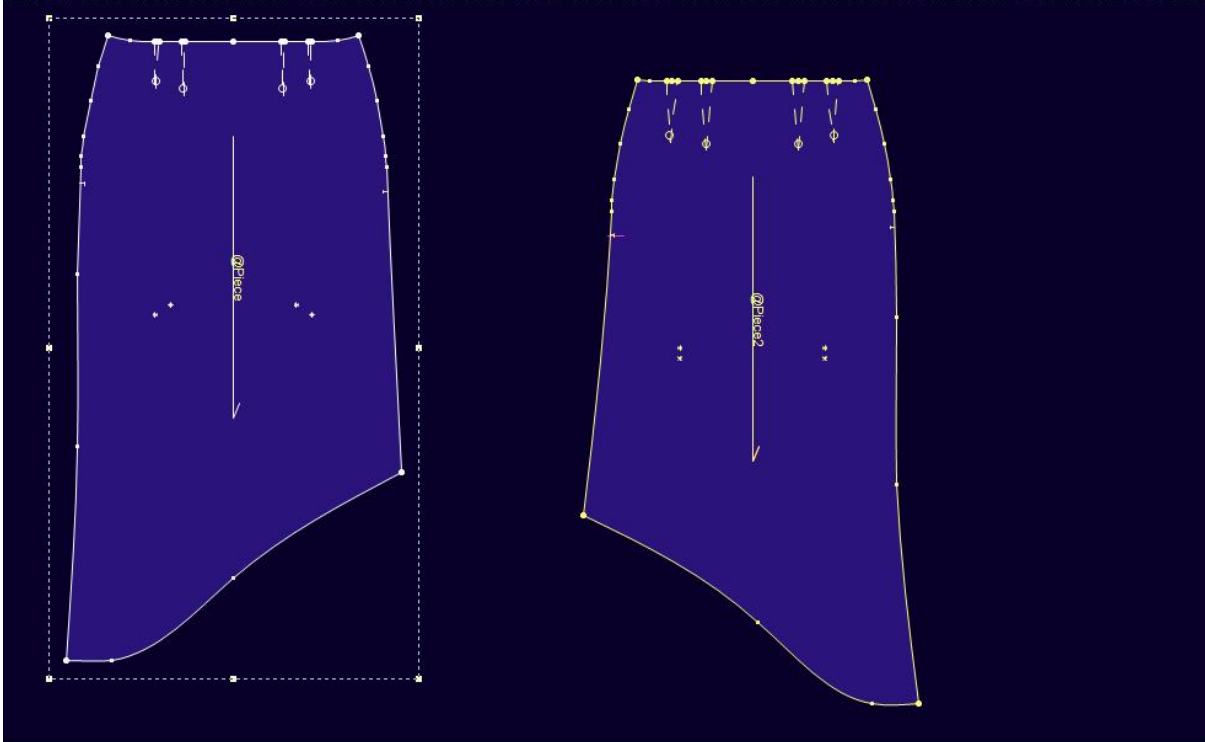
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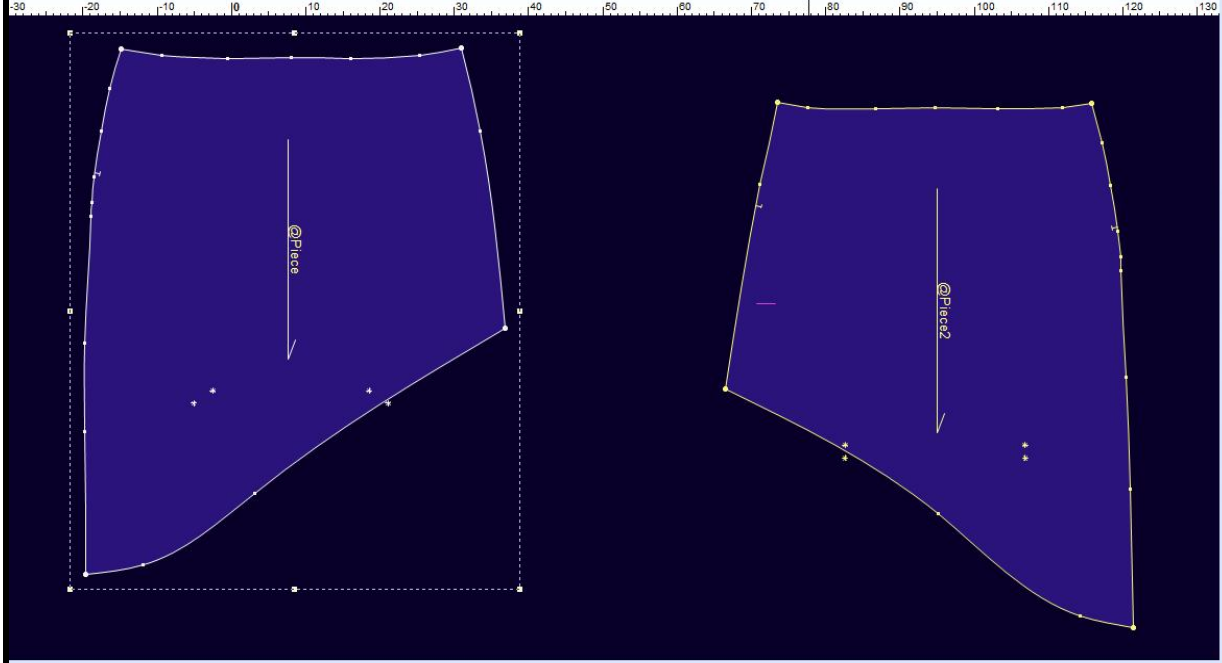
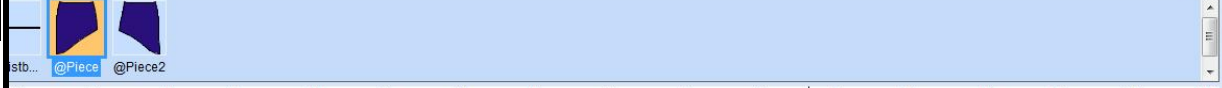
Create Remove Duplicate

Add Pieces Remove Piece

Material Quantity Pair Opposite

Pieces Window

Second layer green Skirt.mod



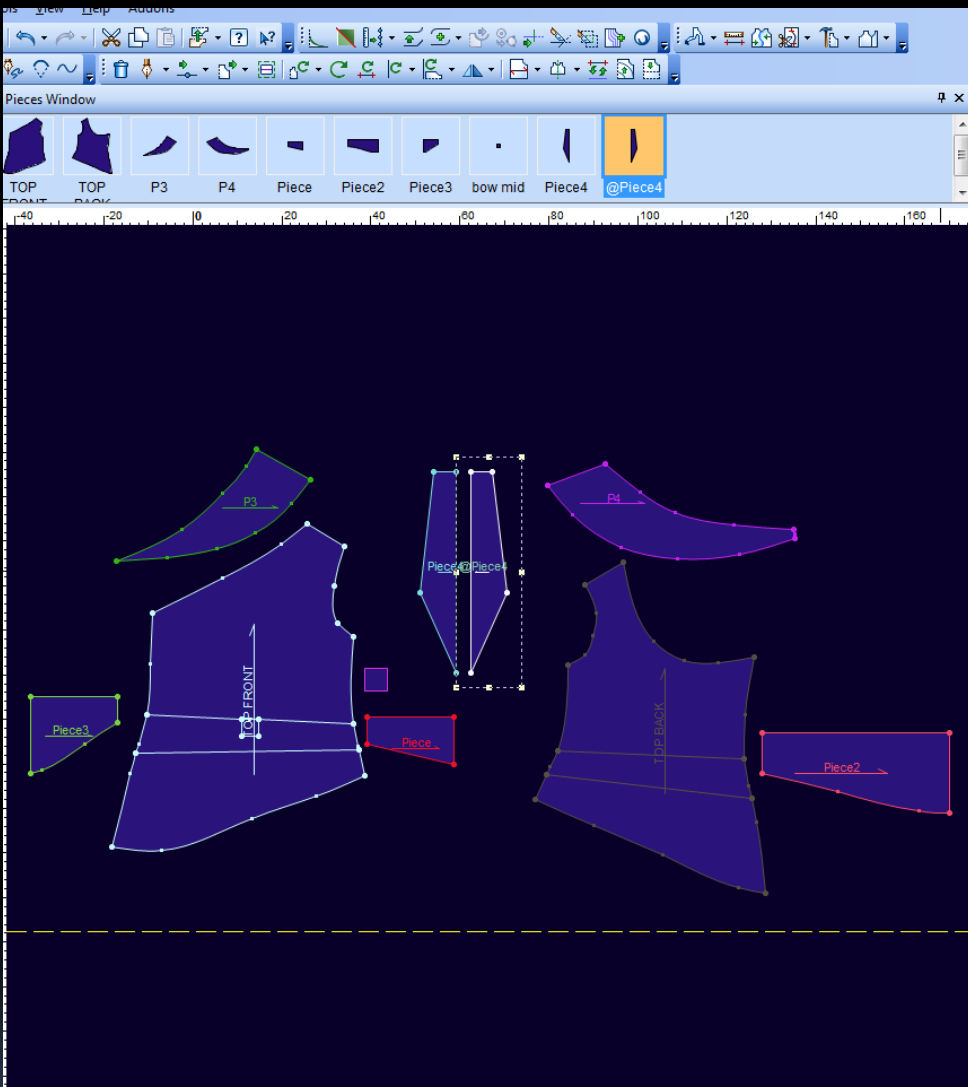
File Sets

File Sets Menu

File Sets: skirt wb

Description:

Piece Name	Code	Description	Material	Quantity	Pair	Opposite
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3D Properties

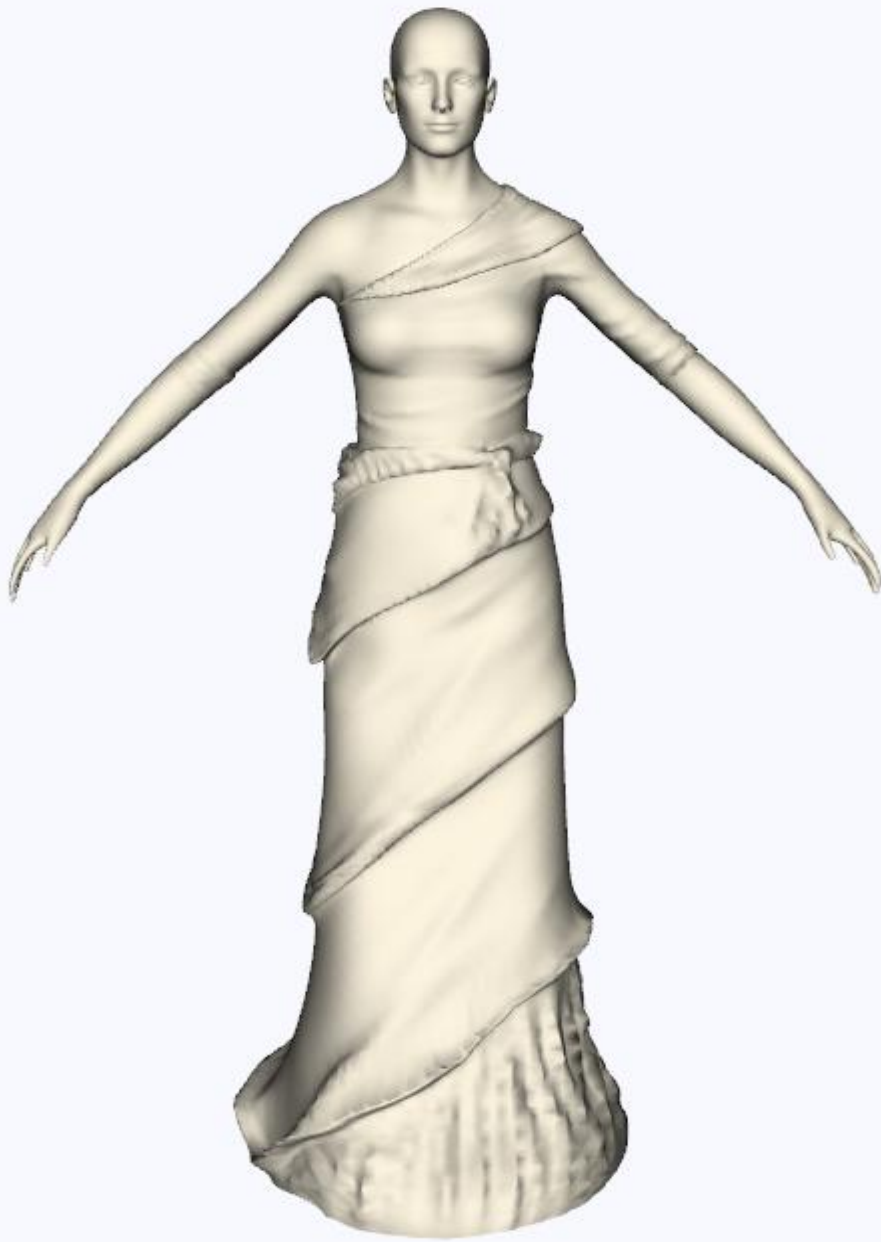
Piece: @Piece4

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Positioning	
2D to 3D Orientation	Synchronize
Location	Front
Shape	Flat
Layer	7
Symmetry	Aligned
Resolution	1 cm
Group Name	
Fabric Parameters	
Fabric List	C:\Program Fi
Select Fabric	Unknown Fabi
Bending	500; 500 dyn*c
Stretch	250; 250 gram
Shear	300 dyn/cm
Friction	0.01
Thickness	0.1 cm
Weight	180 gr/m^2
Shrinkage	0; 0 %
Pressure	0 psi
Set Defaults	Defaults



Size: base





3D sketch imported from Mudbox to Optitex

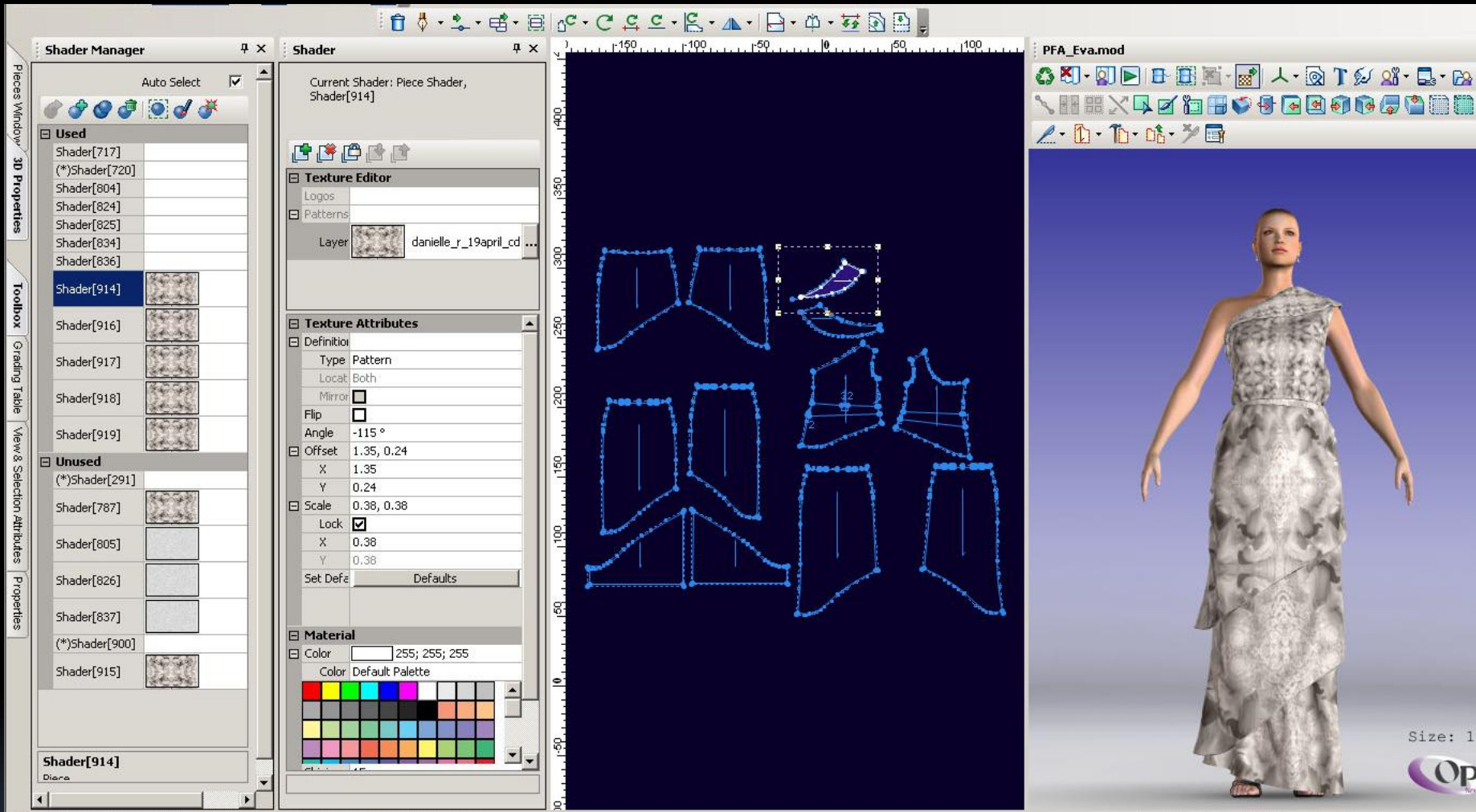


Patterns & Dress constructed in Optitex

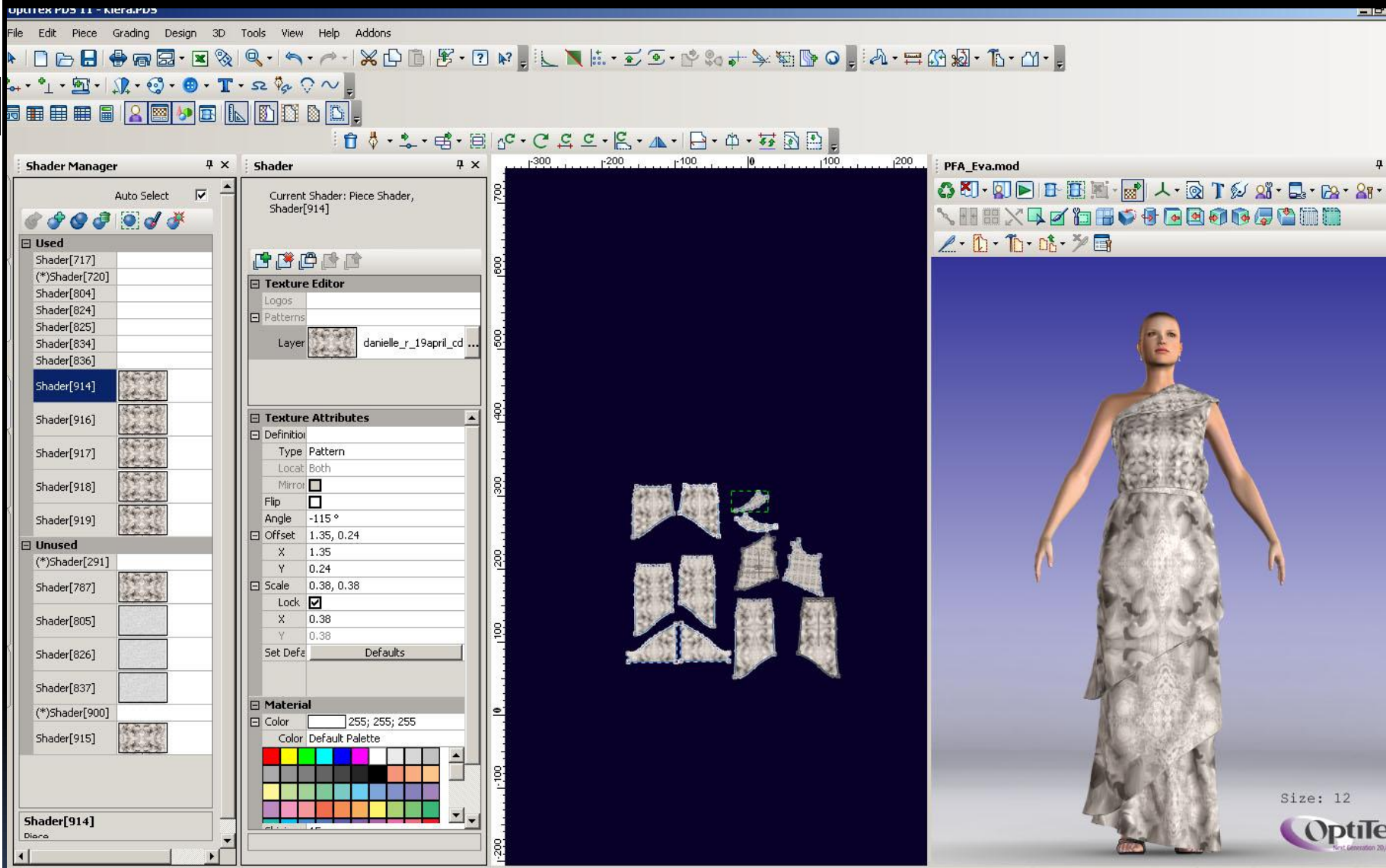


Surface design final year student 3D visual merchandising tegular product designed in Mudbox digital clay modelling software converted into a 2D/3D digital print repeat on silk twill using AVA print design software.

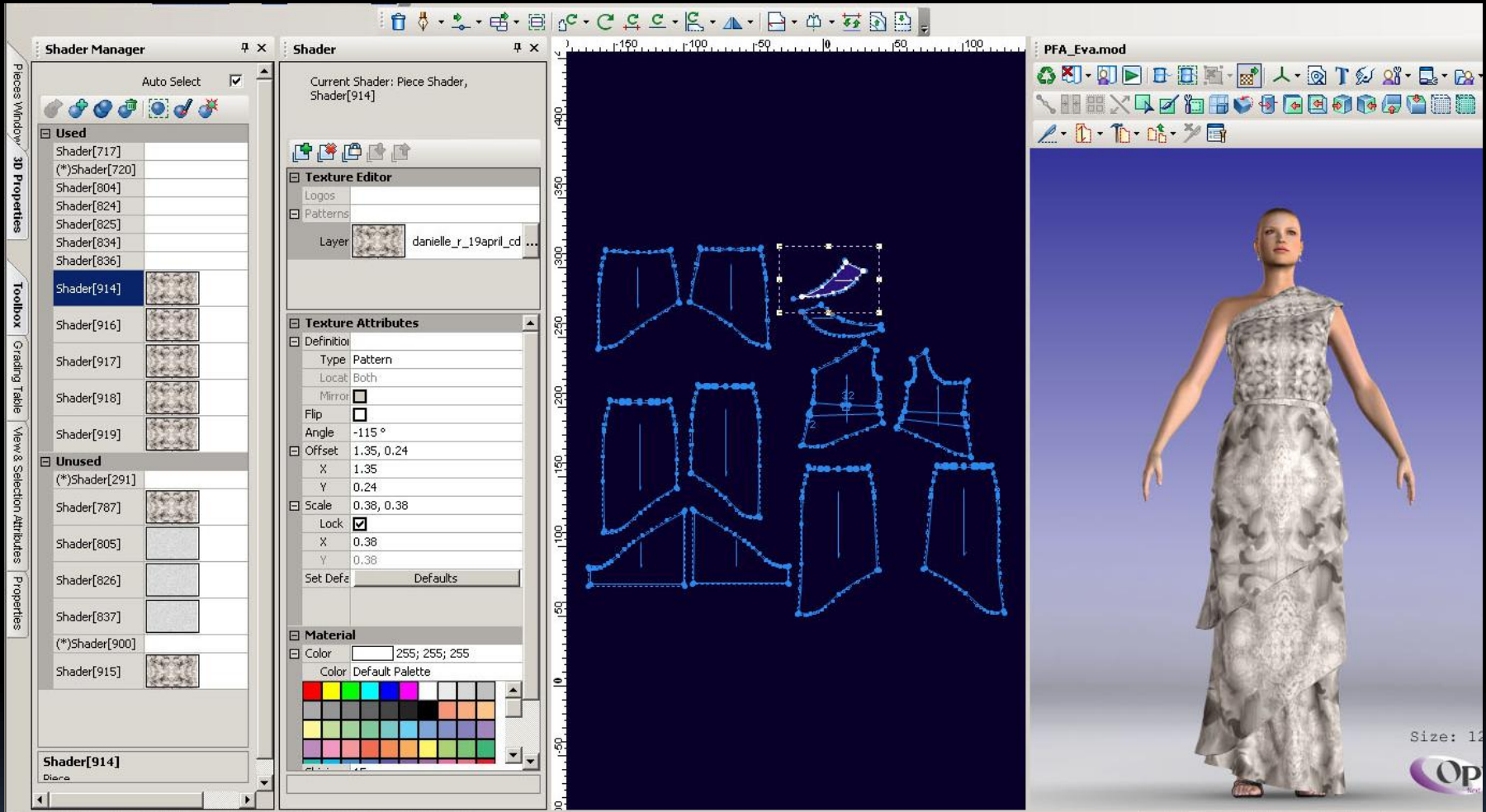
Print repeat - Imported into Optitex pattern design software for accurate print placement on patterns & visualisation on 3D model



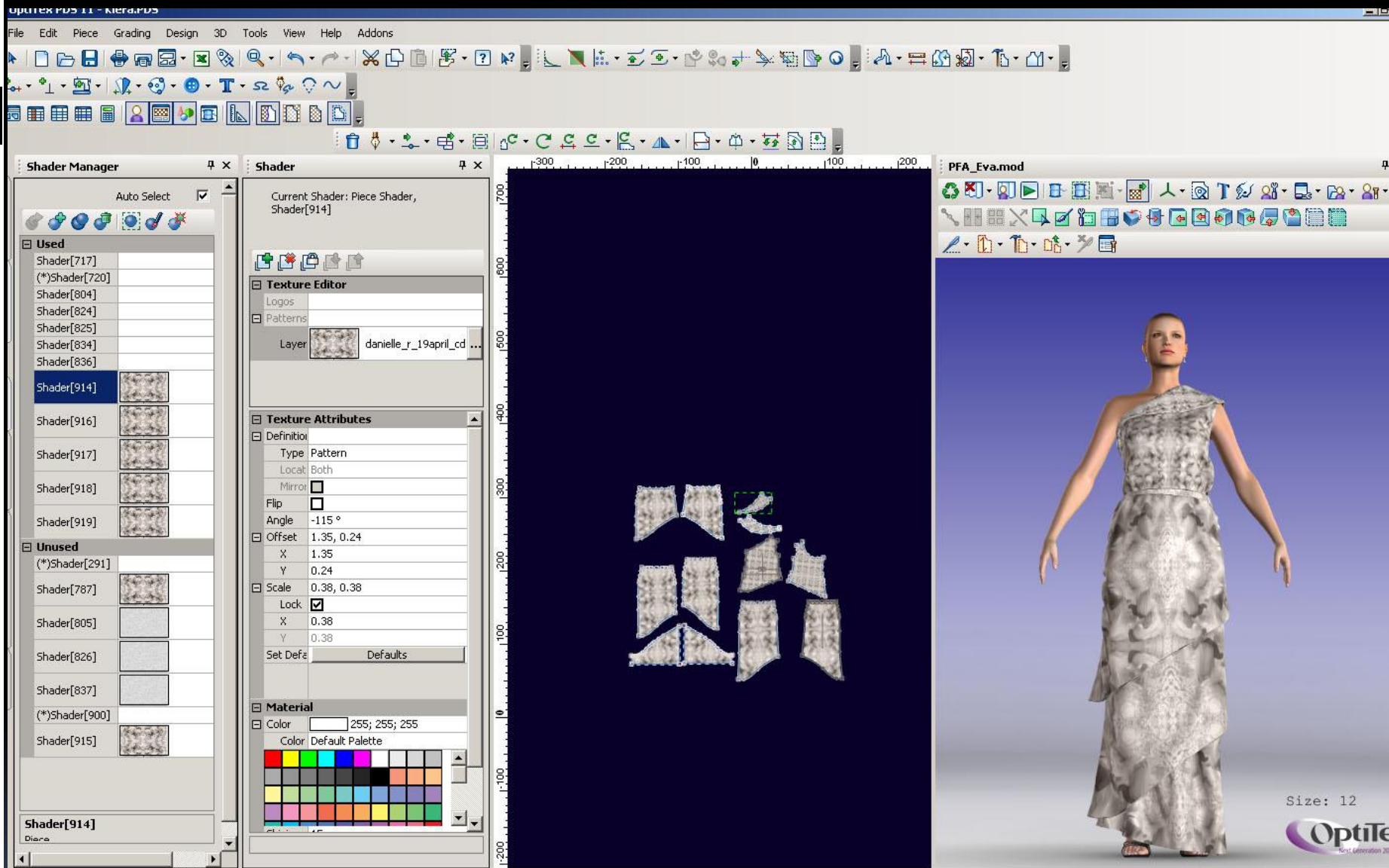
2D & 3D Pattern design



2D and 3D Print placement and adjustment: size and rotation



Pattern design 2D patterns & 3D virtual sample.



2D and 3D Print placement and adjustment



Virtual toile 1:

3D virtual sample designed from costume illustration in Mudbox






Toile 2: Virtual patterns and 3D sample adjusted and re-designed in Optitex. Patterns plotted from Optitex - Patterns cut and re-designed during physical sampling & toile processes on a live fit model creating an exact fitted asymmetrical skirt and top for the live model.







- **Conclusions:**

- Through Univeristy TALI funding this research has explored and identified trans-disciplinary approaches and methods for digital concept, pattern modelling, patterns extraction from sculpted 3D models using integrated 3D technologies in Costume & Fashion Design.
 - A Practice based research approach has guided the researchers to evaluate the effectiveness of 3D digital sculpting software: ZBrush, Mudbox, polygon modelling software 3D Studio Max, Maya and 3D/2D pattern design software such as Optitex.
 - Digitally sculpting tools for 3D concept creation were evaluated with a group of BA Costume design students, digital moulage, developing colour palletes, and texturing the surface of a digital human character or model
 - Integrated creative (Industry and Education) collaborative thinking and practice has contributed to developing learning and teaching innovations and industry technology relationships.
 - Further work proposed will analyse these experiences to develop themes to propose effective intergration into the Fashion & Textiles (also inc. costume, surface, craft) BA & MA programmes.
- 



thankyou for everything:

Sewing & Making:

Maureen Jackson: Fashion Technician

Model:

Agne Andriulionyte: BA(Hons) Fashion Design with Marketing



Photography:

Shazia Ahmed: MA Fashion Design