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Taylor, Andrew

Investigating the Application of 3D CG Technologies in Fashion Education

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# An Investigation into 3D Software Tools for Apparel Design and Construction in a Virtual Environment

Andrew Taylor

HEFCE funded Research Student: 1998-2000

Department of Clothing Design & Technology &  
Department of Textiles/Fashion

Faculty of Art & Design

Manchester Metropolitan University

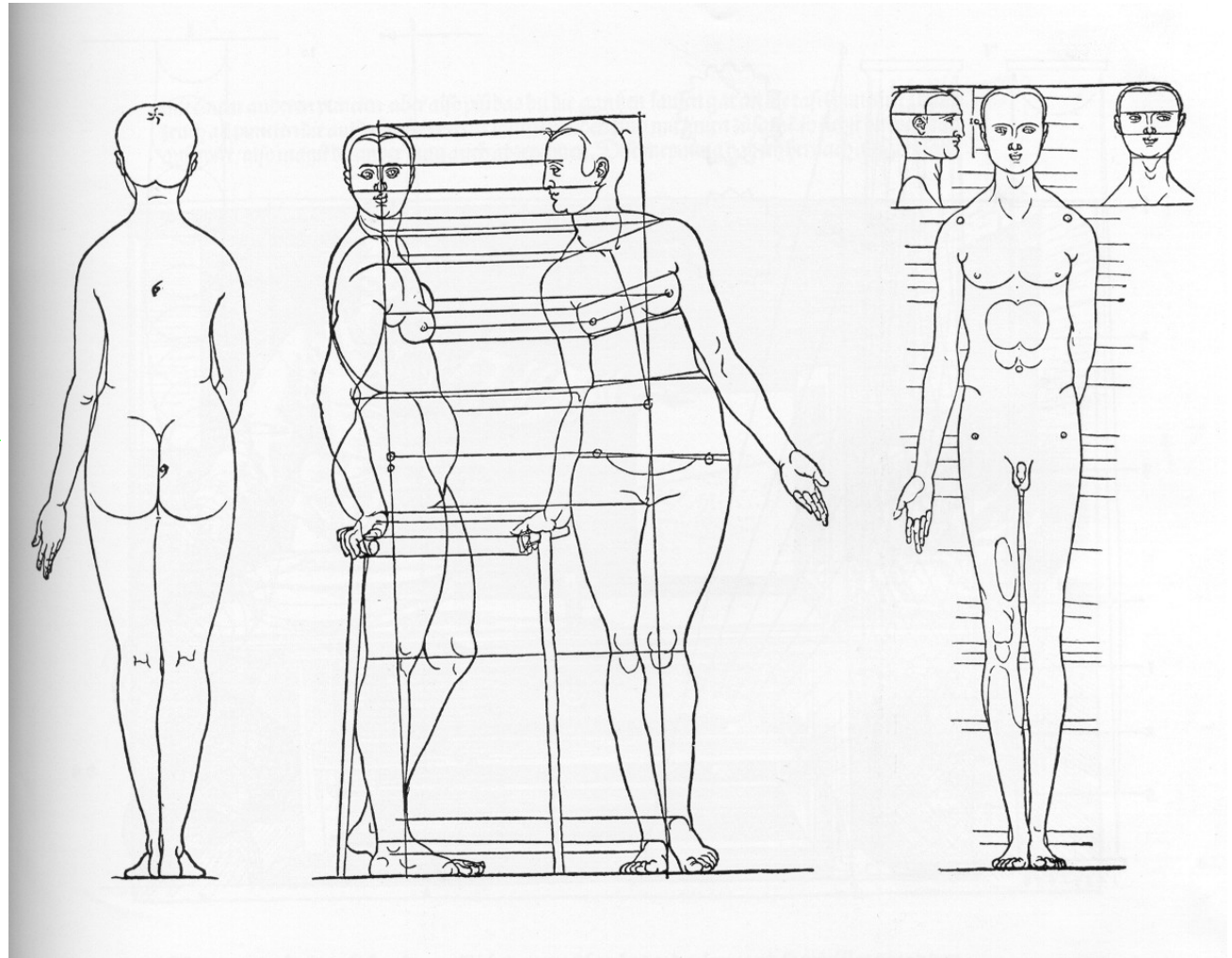
# Overview

- Starting at the Beginning and Learning new things:
- body, measurement, clothing, fashion, illustration, pattern design and construction and presentation/merchandising
- Exploring the software available and how it is used in Fashion/Clothing Education and Industry
- Introducing 3D software to learning and teaching
- 3D now

**MMU:**  
**3D Software**  
**Design Research**  
**1998-2000**

**RESEARCH OF**  
**3D BODY &**  
**MEASUREMENT**

# Body Measurement



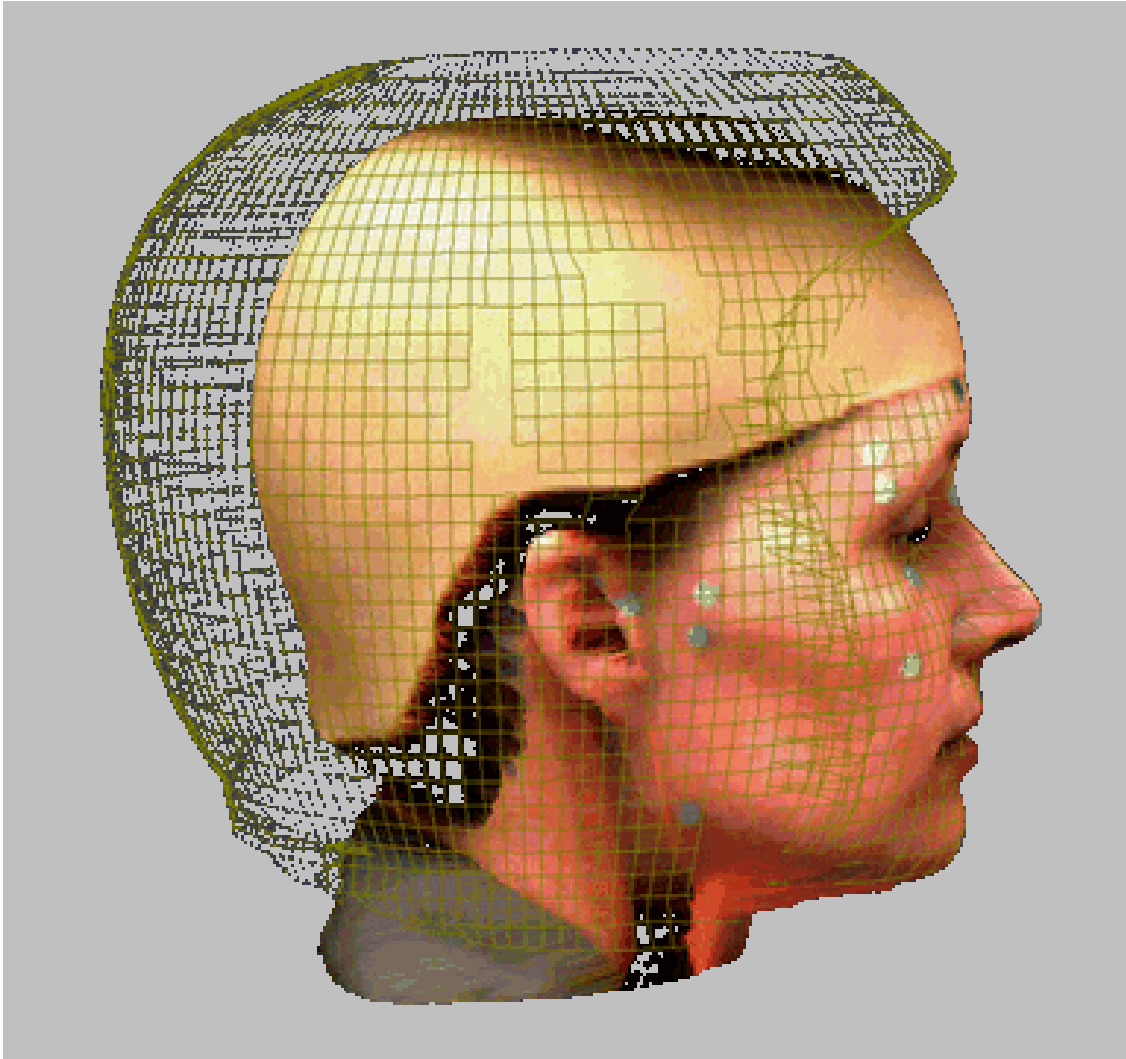
# Made- to- Measure Clothing



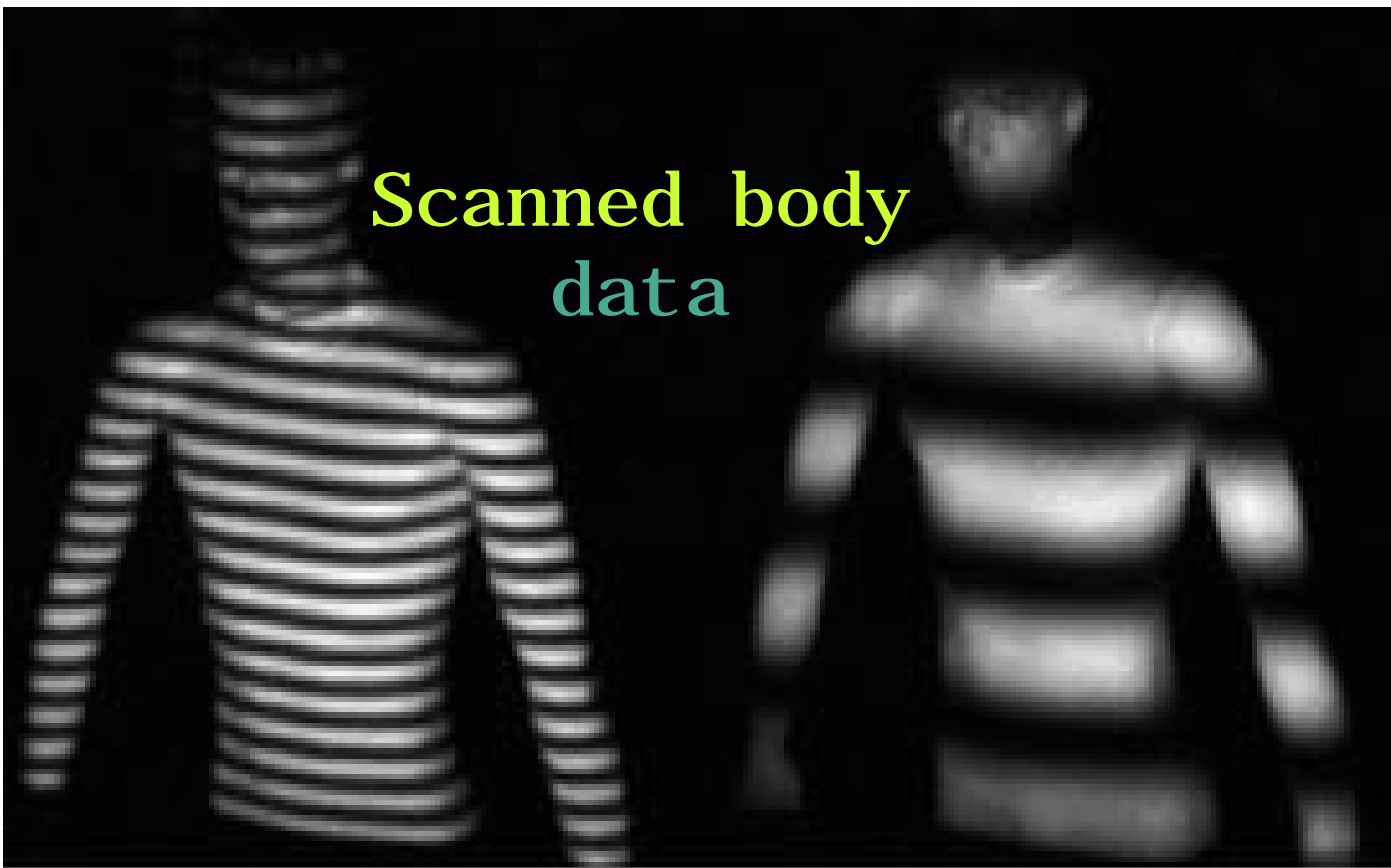
# Standard Body Measurements

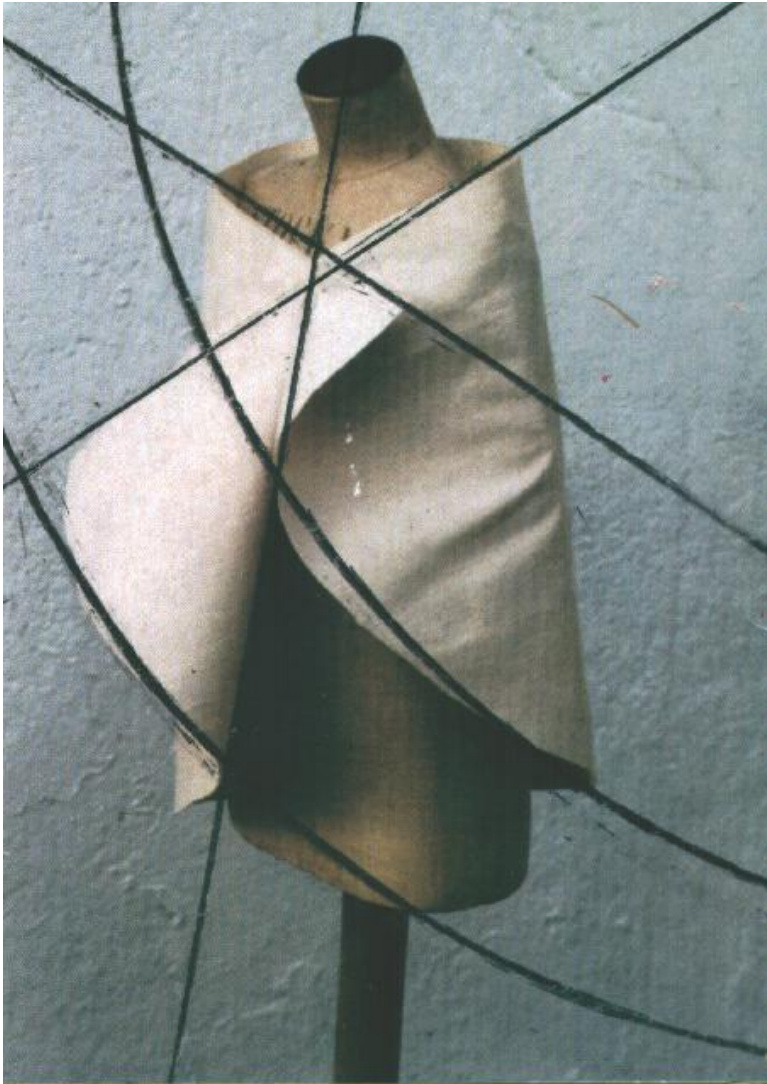
	SML	MED	LGE	XLGE
SIZE SYMBOL	S	M	L	XL
BUST	82	88	94	100
WAIST	62	68	74	80
HIP	87	93	99	105
BACK WIDTH	32.8	34.4	36	37.6
CHEST	30.6	32.4	34.2	36
SHOULDER	11.9	12.3	12.6	13
NECK SIZE	35.5	37	38.5	40
DART	6.1	7	7.9	8.8
TOP ARM	26.4	28.4	30.4	32.4
WRIST	15.3	16	16.7	17.4
ANKLE	23.1	24	24.9	25.8
HIGH ANKLE	20.1	21	21.9	22.8
NAPE TO WAIST	39.2	40	40.8	41.6
FRONT SHOULDER TO WAIST	39.2	40	41	42
ARMHOLE DEPTH	20.2	21	21.8	22.6
WAIST TO KNEE	57.7	58.5	59.3	60.1
WAIST TO HIP	20.2	20.6	21	21.4
WAIST TO FLOOR	102.5	104	105.5	107
BODY RISE	27	28	29	30
SLEEVE LENGTH	57.4	58.4	59.4	60.4
SLEEVE LENGTH (JERSEY)	51.4	52.4	53.4	54.4
<b>Extra measurements (garments)</b>				
CUFF SIZE SHIRTS	21	21.5	22	22.5
CUFF SIZE, TWO-PIECE SLEEVE	13.5	13.75	14	14.25
TROUSER BOTTOM WIDTH	21.5	22	22.5	23
JEANS BOTTOM WIDTH	18.5	19	19.5	20

# 3D Scanning and construction software developed by government military research

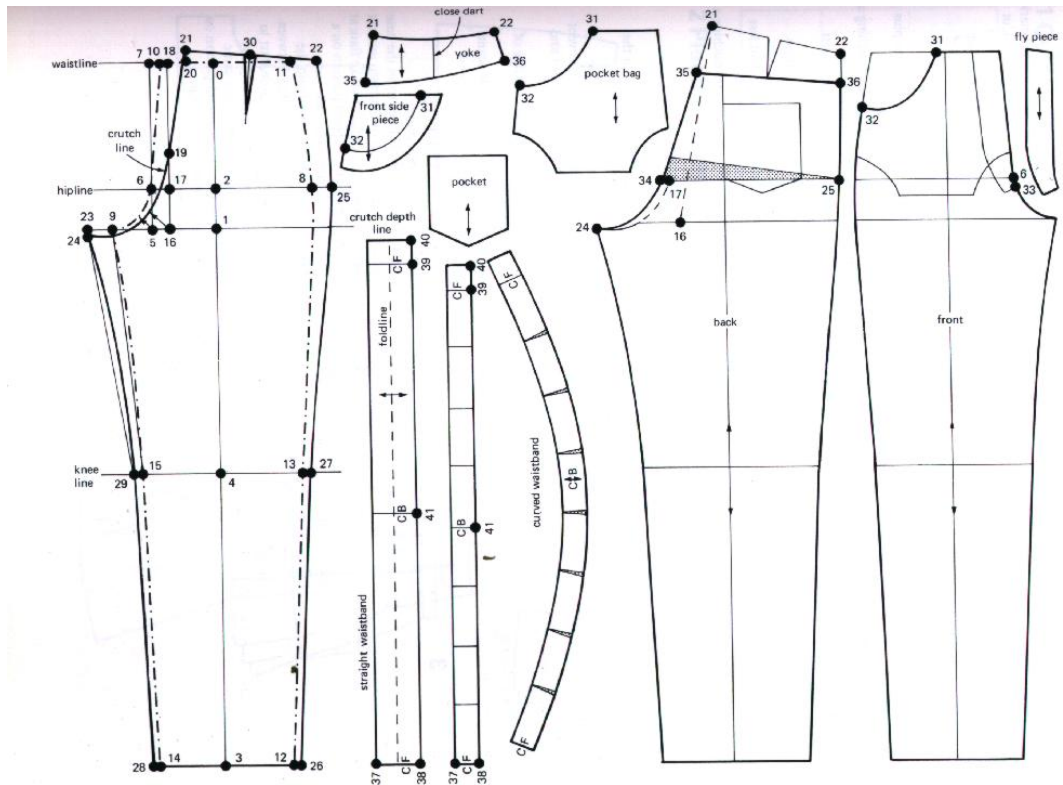


# Scanned body data





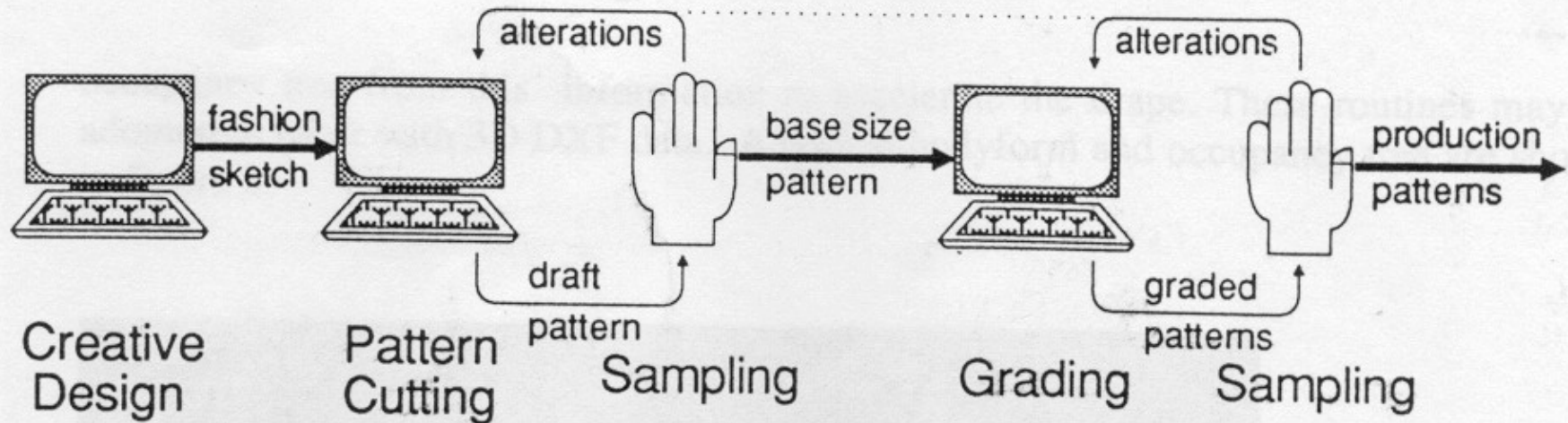
Dummy Toile,  
workroom  
stand....



block is a  
foundation  
pattern  
constructed  
to fit an  
average  
figure

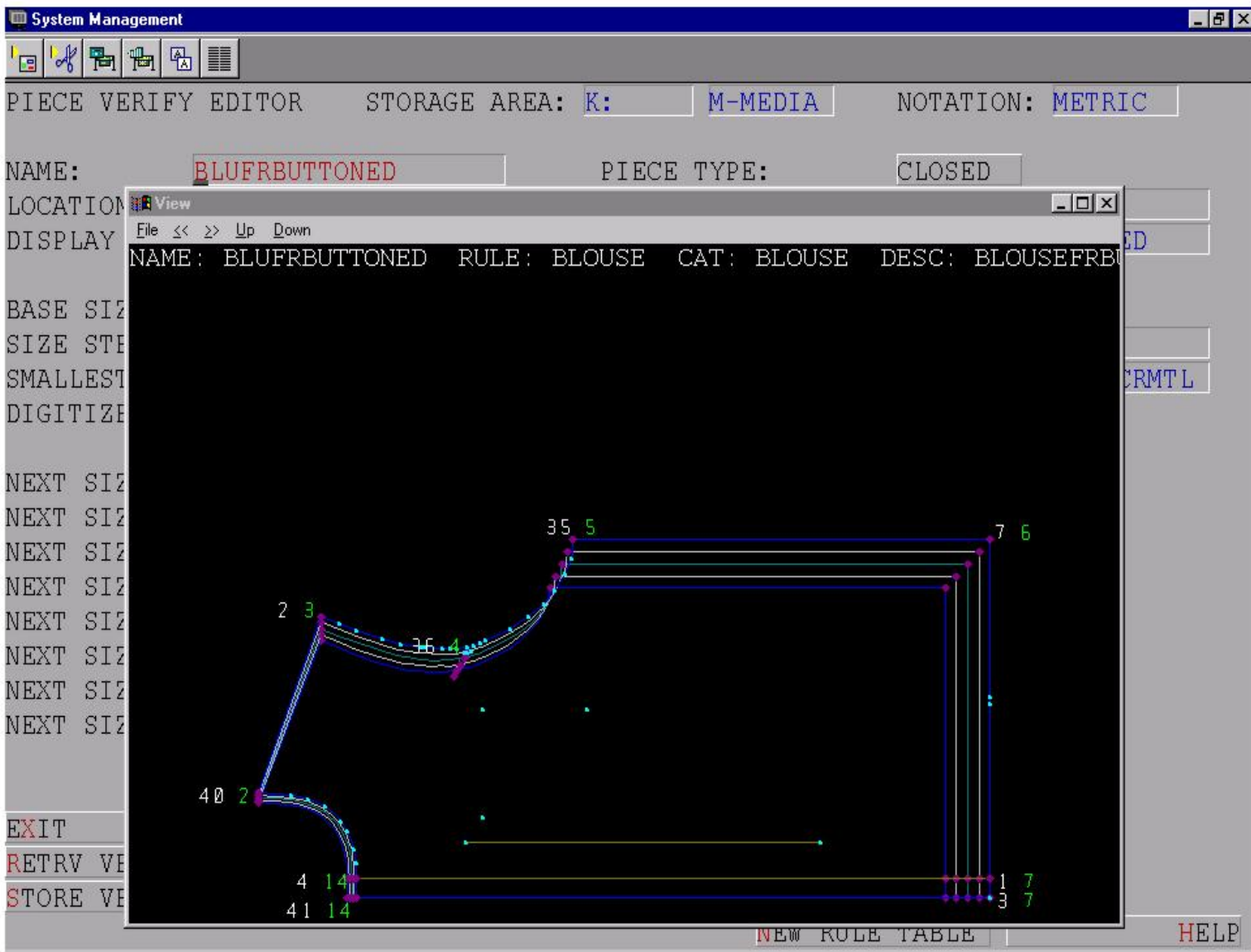
MMU:  
3D Software  
Design  
Research  
1998-2000

# Identifying the 3D Design development gap in process in fashion / apparel design and manufacture (Fozzard, G & Hardaker, C. 1994)





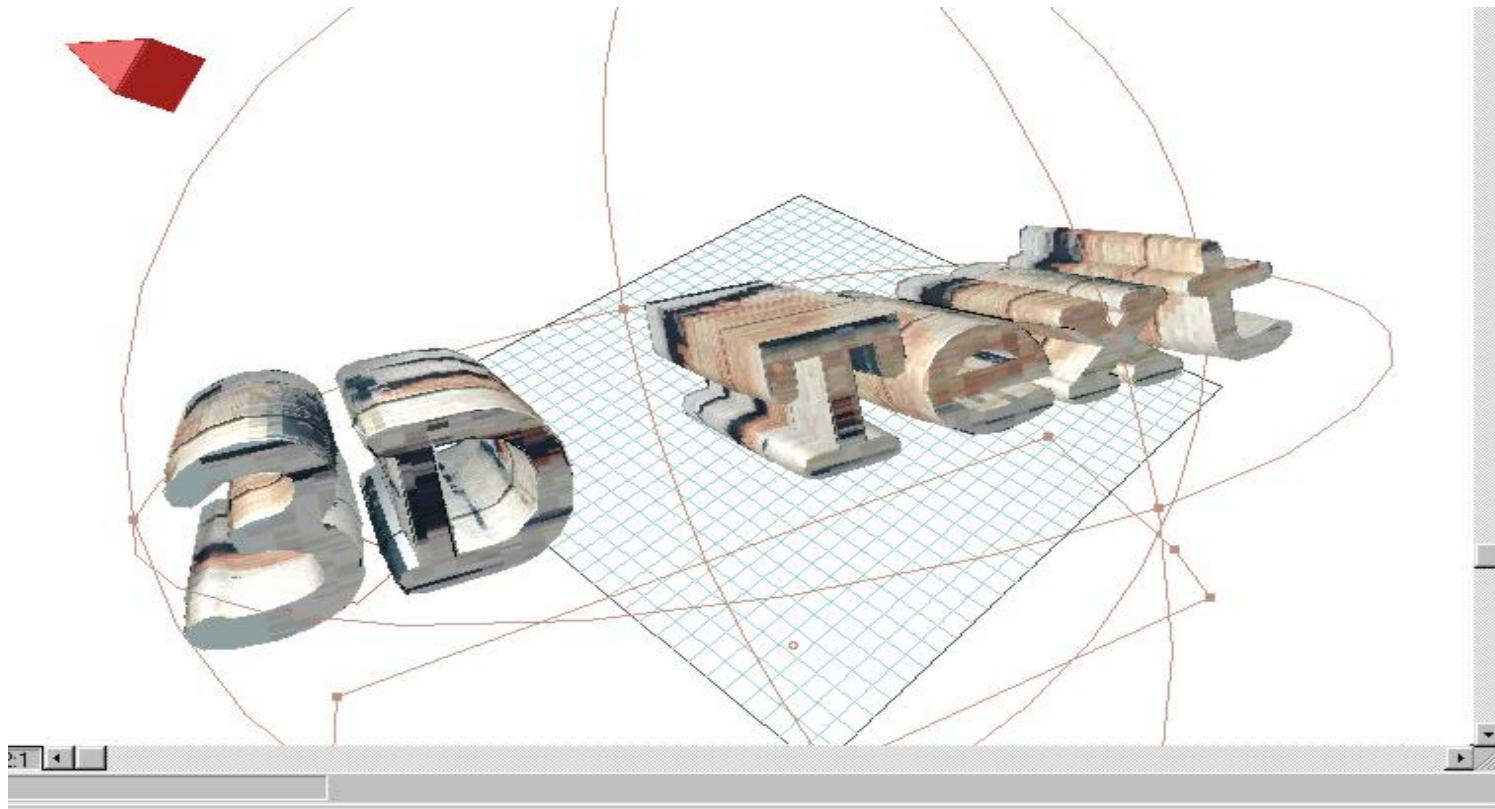
Sourced from CDI. 1998.  
Department of clothing design & Technology,  
MMU



## Gerber Accumark 2D Pattern Design System

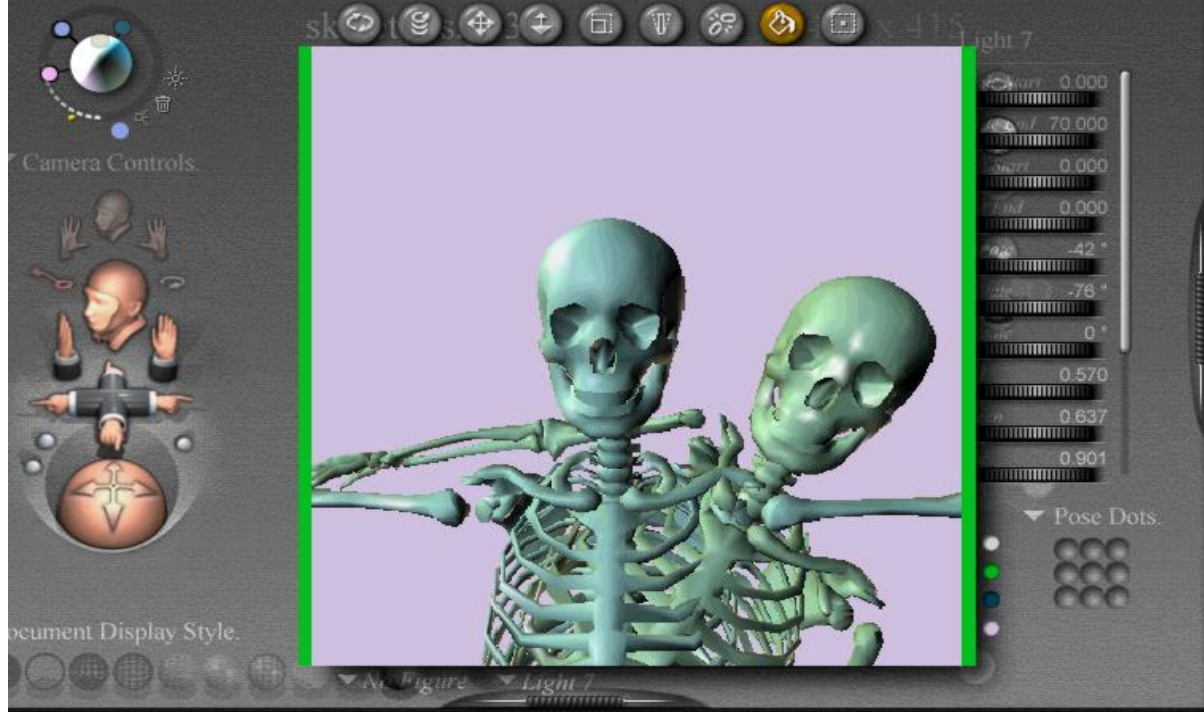
Taylor, A. 1998. sourced Screen grab in CAD suite  
Department of clothing design & Technology. MMU





**Corel 6 Dream 3D**  
**Three-Dimensional Illustration Software**

Taylor, A. 1999. 3D Texture mapped on 3D Text  
Department of Clothing Design & Technology.  
MMU

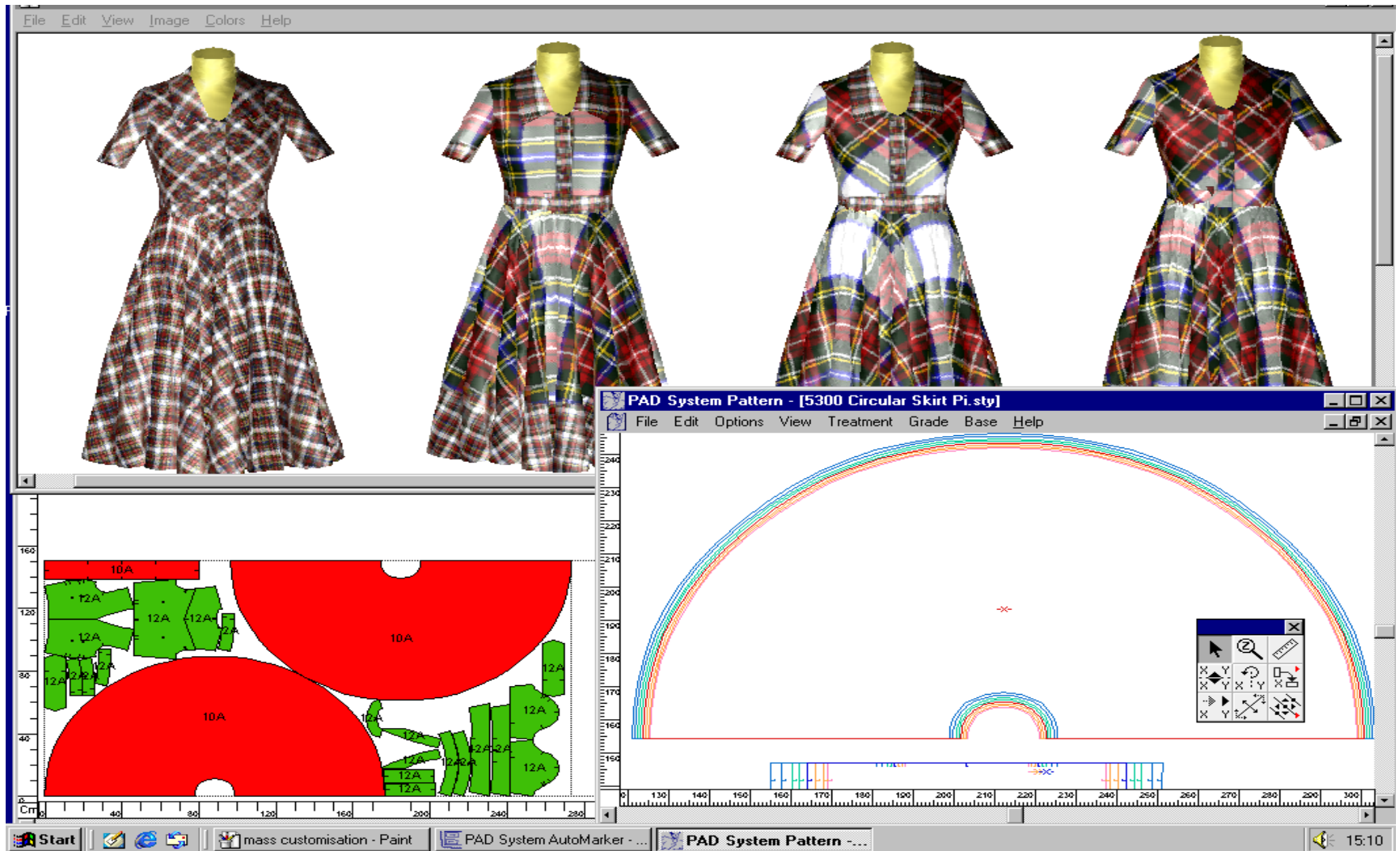


## Poser 2+3+4

# The Remarkable Figure Design and Animation Tool

Taylor, A. 1999. 3D body animation experiments using Poser.  
Department of Clothing Design & Technology. MMU

# PAD Global Garment Design System



Taylor, A. 1999. 2D - 3D. 3d Print experiments using PAD system  
Department of Clothing Design & Technology. MMU

# Fit for Profit Conference

June 1999

Department of Clothing Design  
& Technology

Hollings Faculty

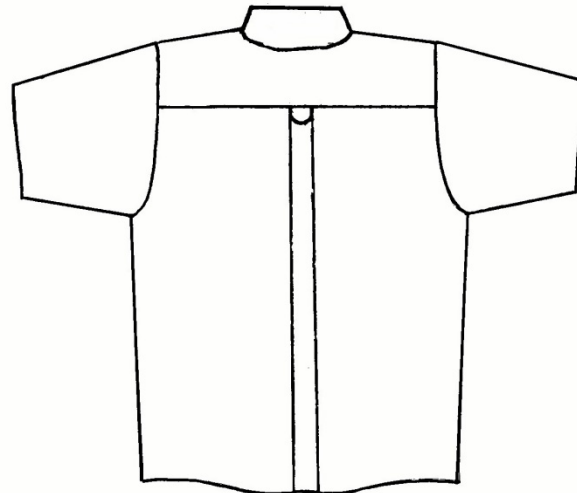
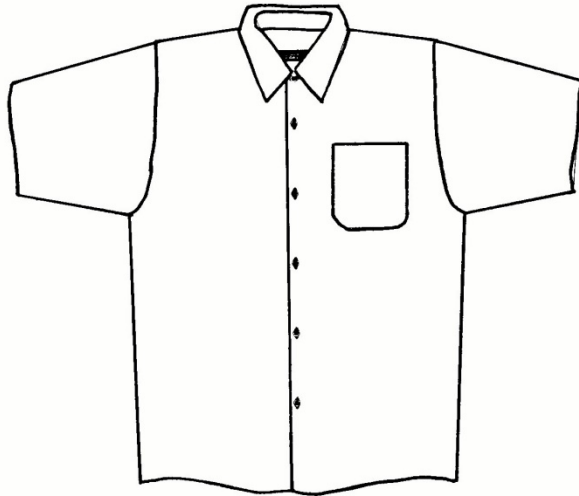
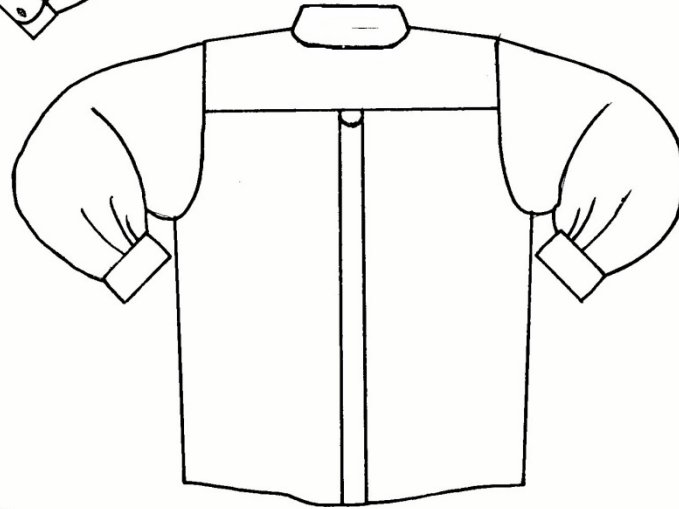
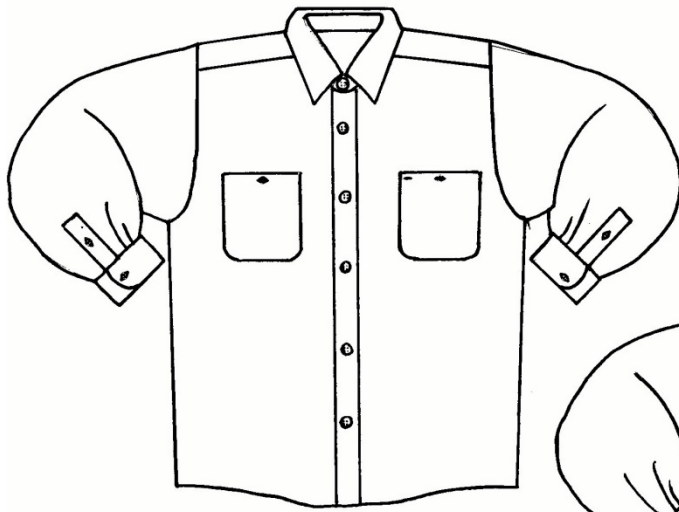
Manchester Metropolitan  
University

## ■ AIMS

- To demonstrate the interface between 2D and 3D software applications
- To simulate 2D style developments in a 3D CAD environment

# 2D-3D PATTERN DESIGN & CONSTRUCTION OF APPAREL IN A VIRTUAL ENVIRONMENT

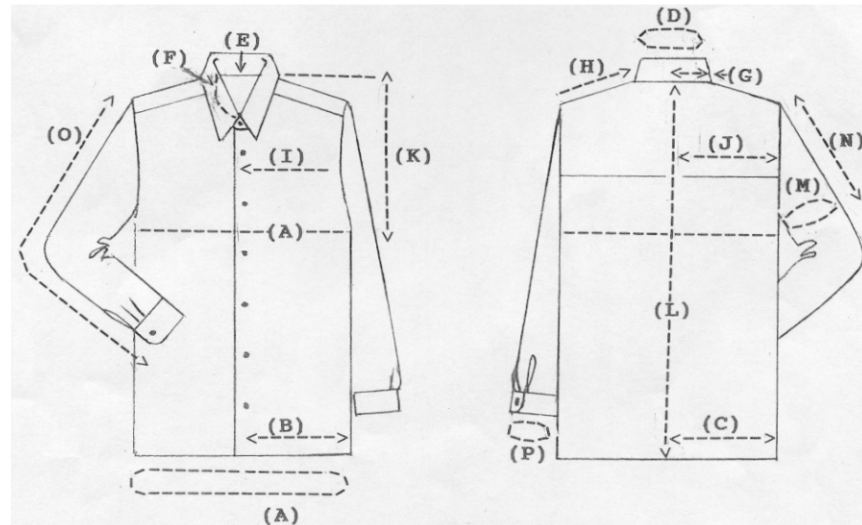
by  
**Andrew Taylor**  
**Terry Bond**



## SIZES

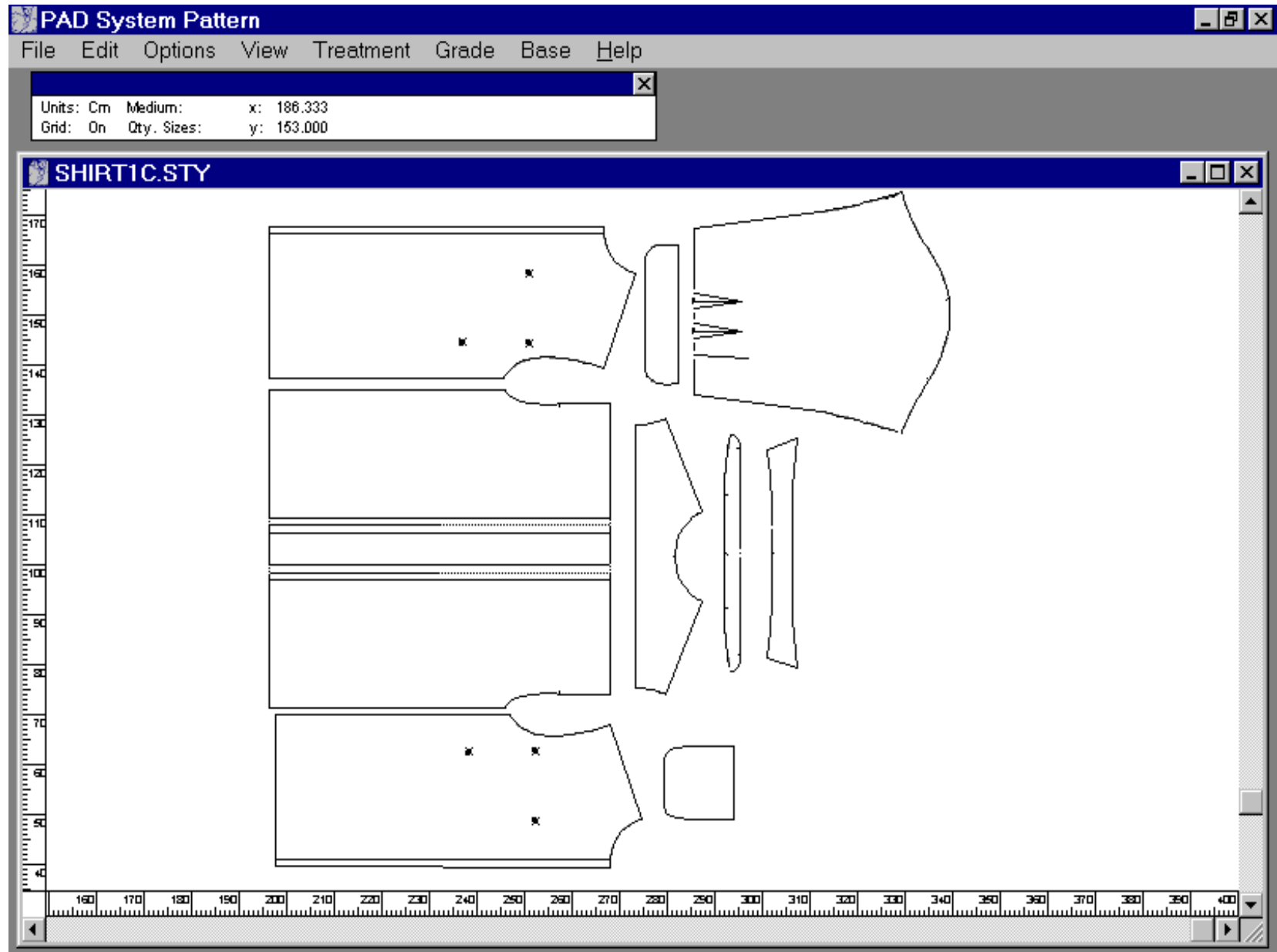
To Fit Chest	90 cm / 36"	95 cm / 38"	100 cm / 40"	105 cm / 42"	110 cm / 44"	5 cm / 2"
To Fit Neck	14.5"	15"	15.5"	16"	16.5"	0.5"

A Full Chest & Hips	106	111	116	121	126	5cm
B Half front chest/Hip	26	27.5	29	30.5	32	1.5
C Half back chest/Hip	27	28	29	30	31	1.0
D neck buttoned	40	41.5	43	44.5	46	1.5
E Neck Line	41	42.5	44	45.5	47	1.5
F Half front neckline	13.6	14.0	14.5	15	15.4	0.45
G Half back neckline	6.9	7.2	7.5	7.8	8.1	0.3
H Dropped Shoulder	19.4	19.7	20	20.3	20.6	0.3
I Half Cross Front	22.5	23.5	24.5	25	26.5	1.0
J Half Across Back	25	23.5	26	26.5	27	0.5
K Scye Depth	28.6	29.6	30.5	31.6	32.6	1.0
L Length	77	79	81	83	85	2.0
M Upper Arm	44	46	48	50	52	2.0
N Slv. head depth	8.5	9.5	10.5	11.5	12.5	1.0
O Slv. Length & cuff	56.5	58.5	62.5	62.5	64.5	2.0
P Cuff Buttoned	20	21	22	23	24	1.0



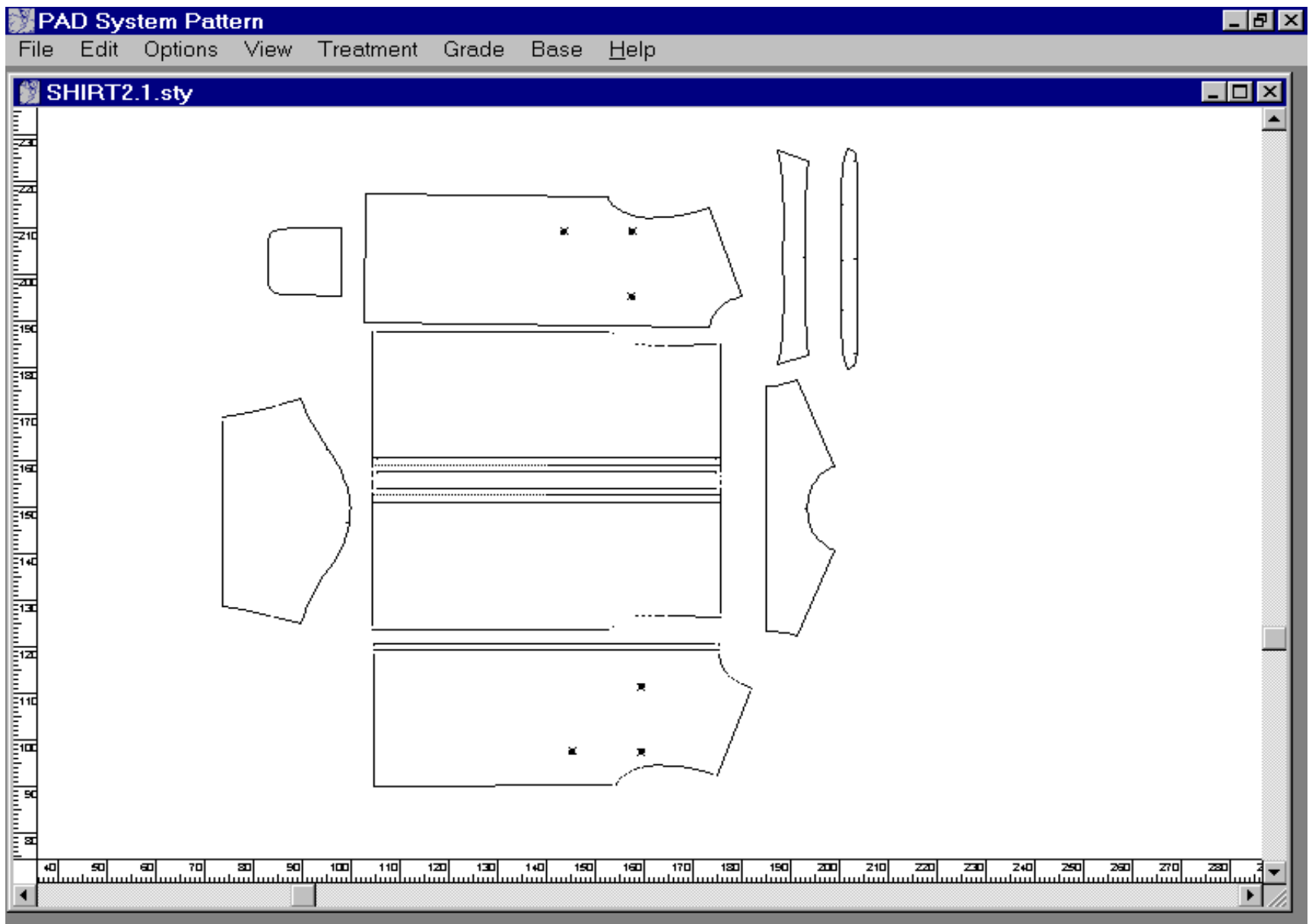
# 2D Pad Pattern Design Module

## STYLE1: LONG SLEEVE SHIRT

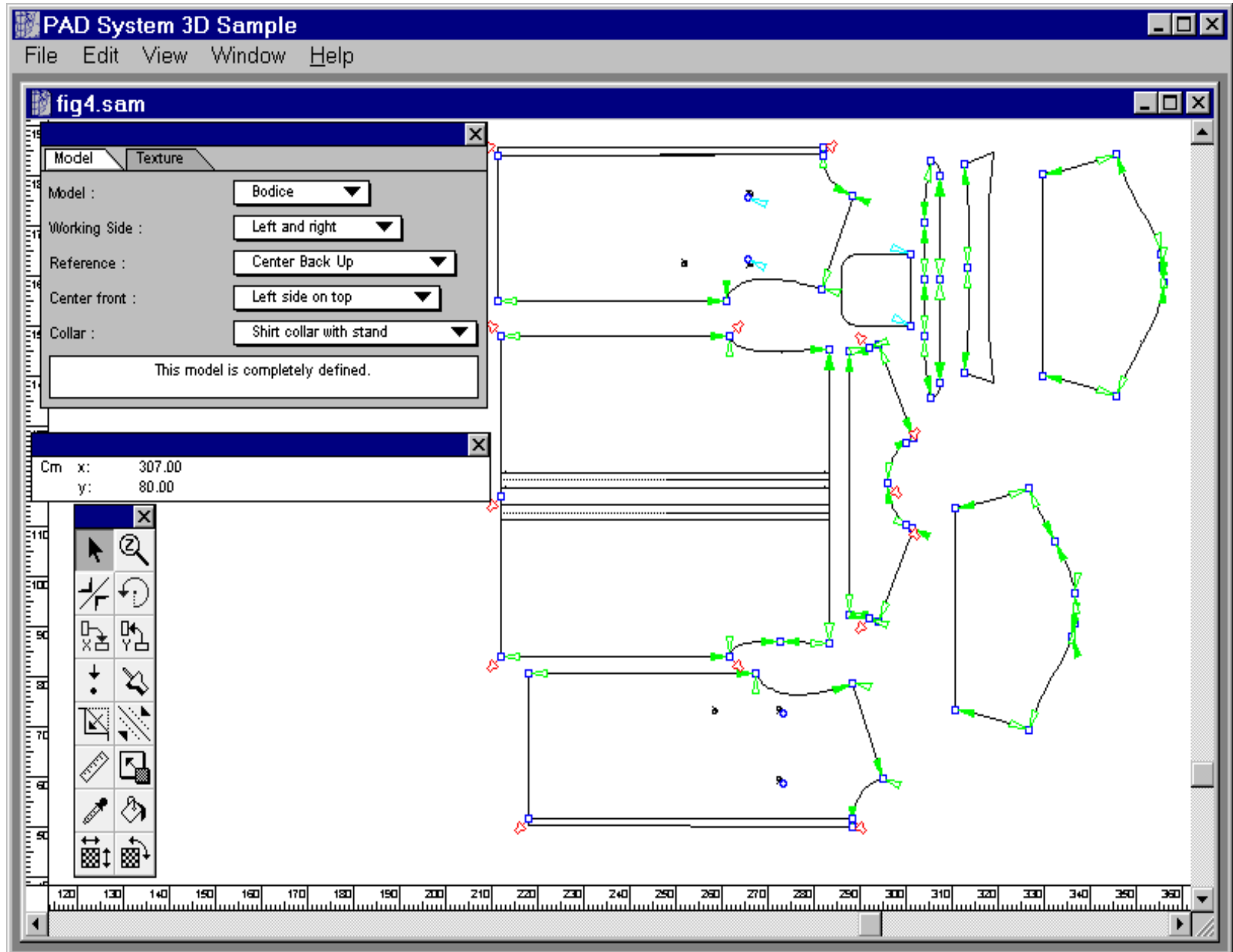


# 2D Pad Pattern Design Module

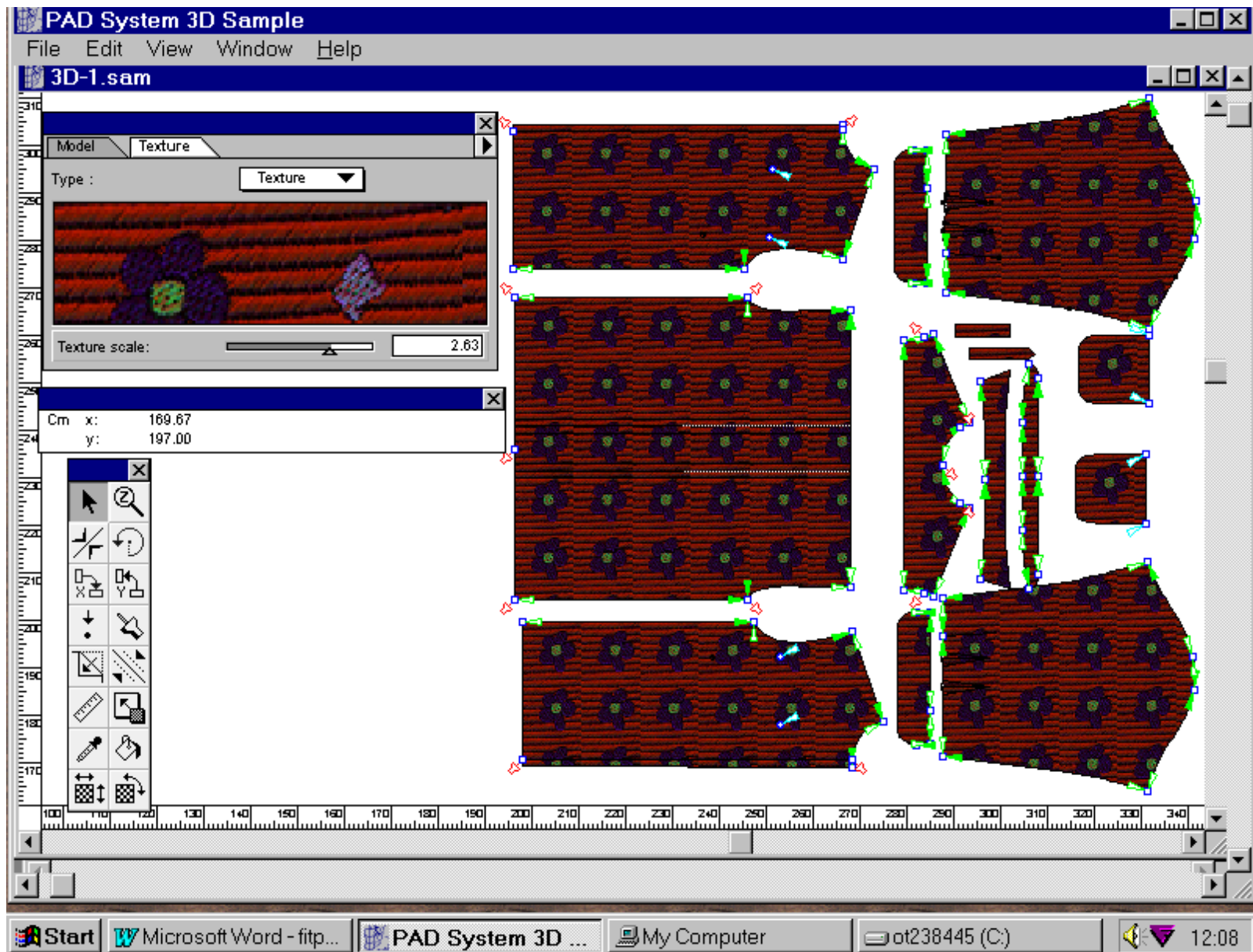
## STYLE2: SHORT SLEEVE SHIRT



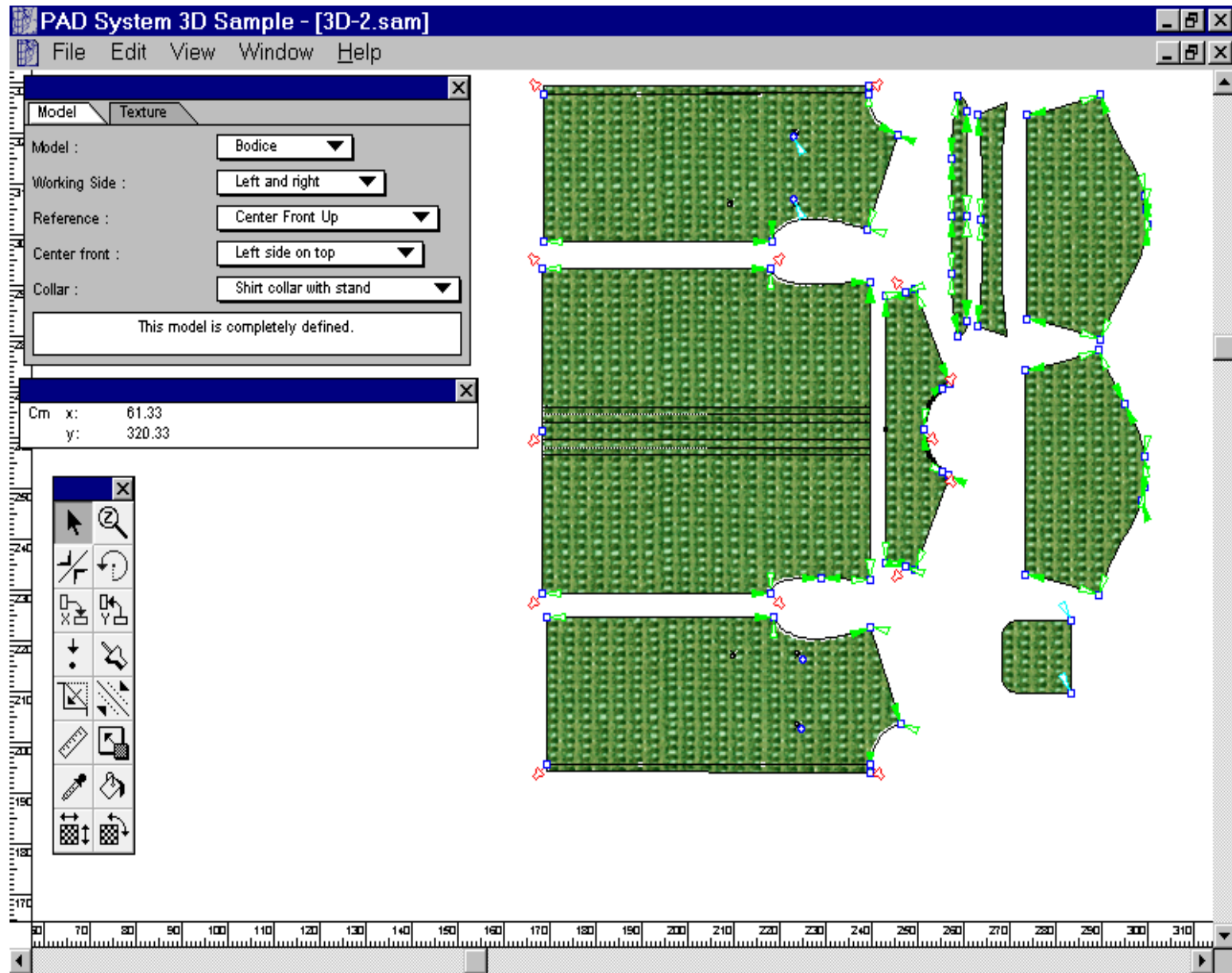
## 3D PATTERN SEWING SEQUENCE



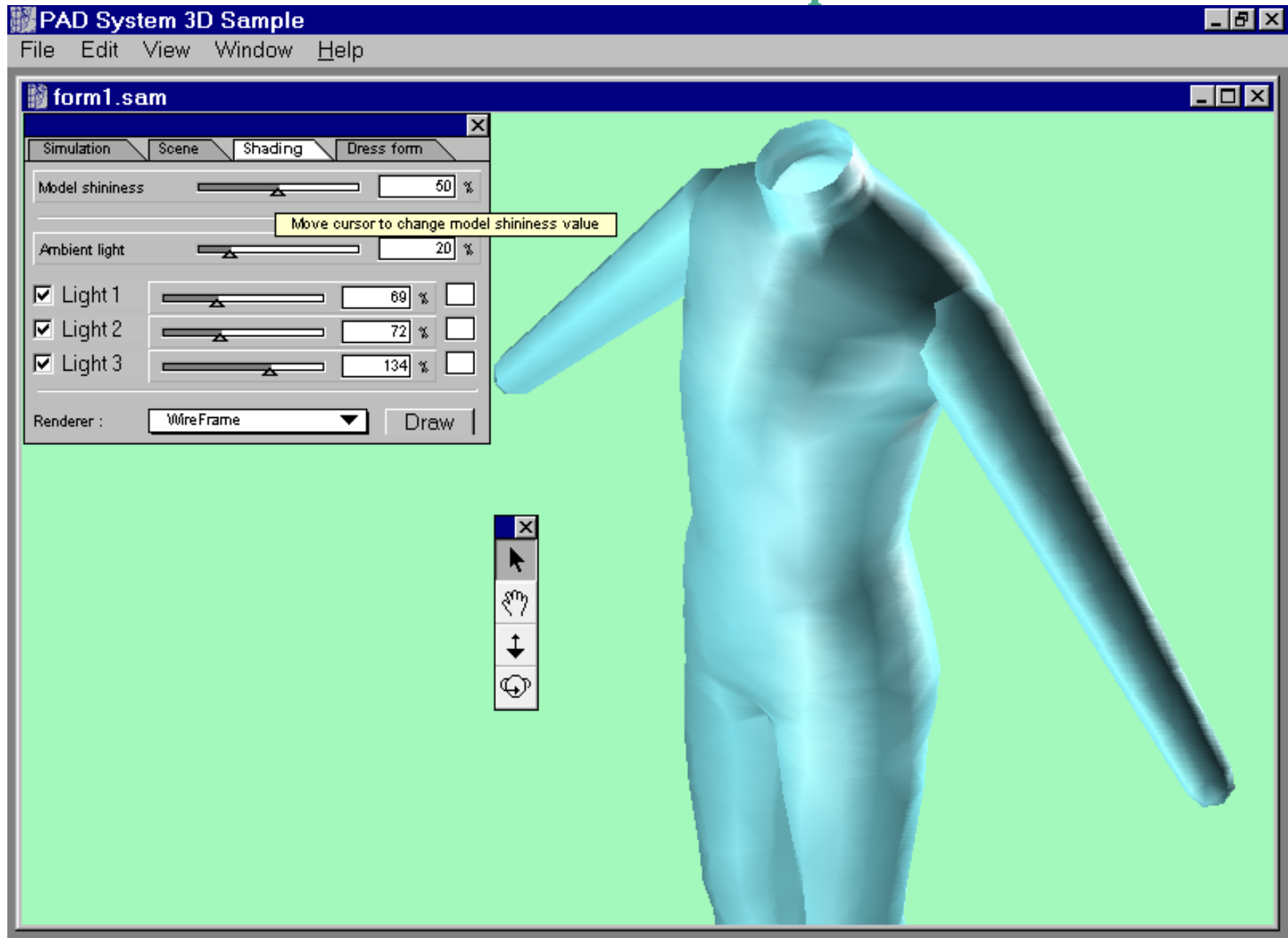
## ADDING COLOUR & TEXTURE TO SHIRT STYLE 1



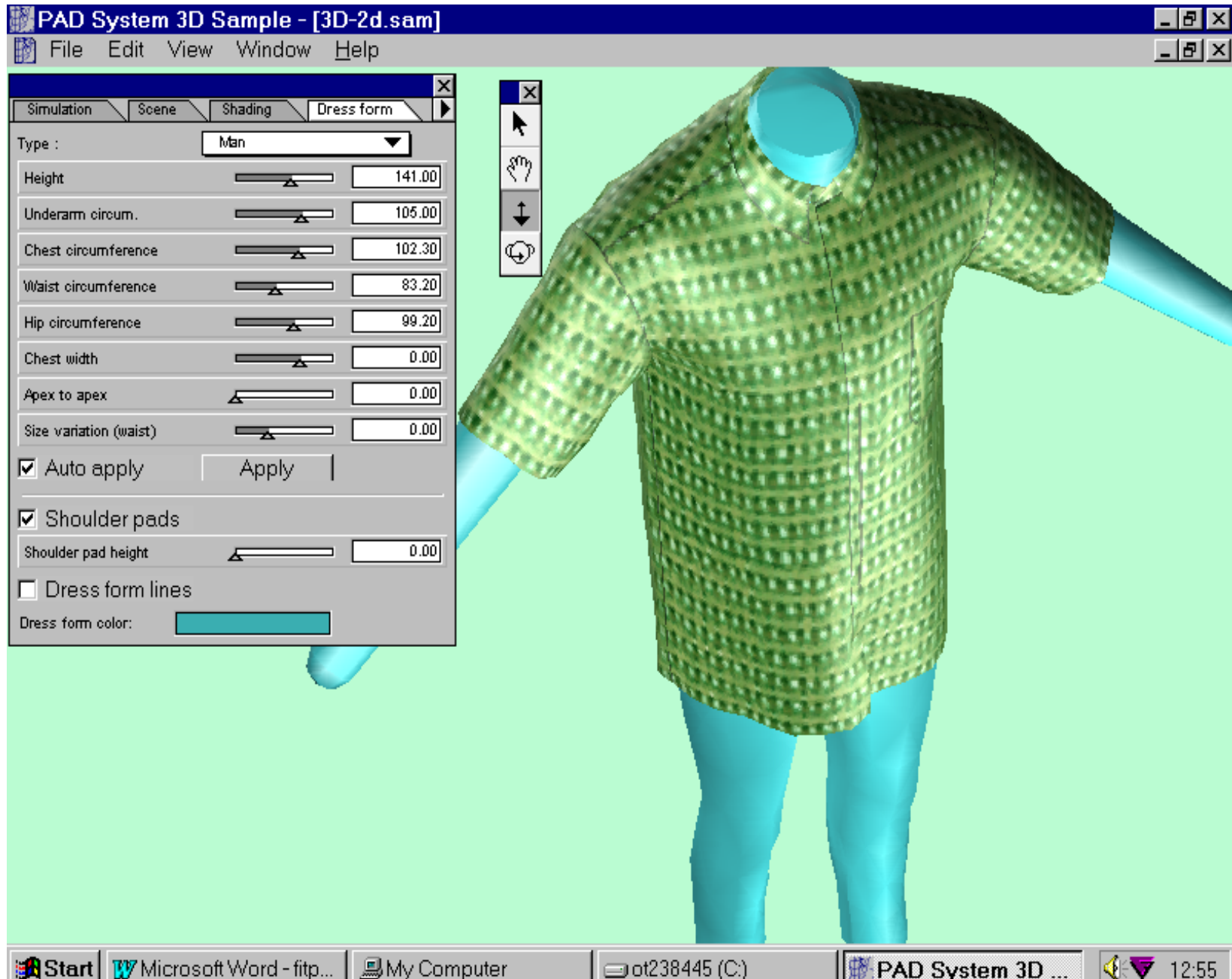
## ADDING COLOUR AND TEXTURE TO SHIRT STYLE 2



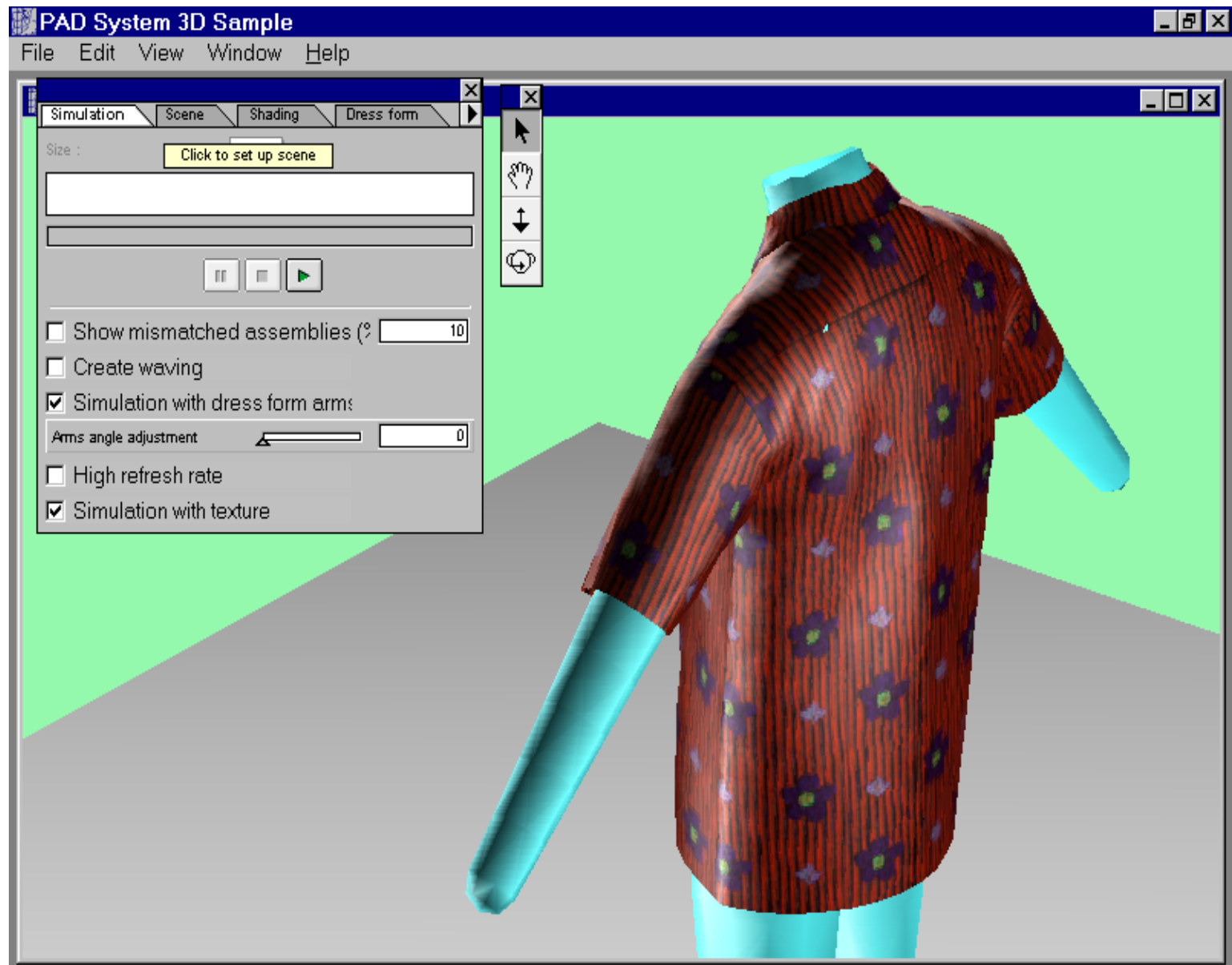
# 3D Virtual Sample Model



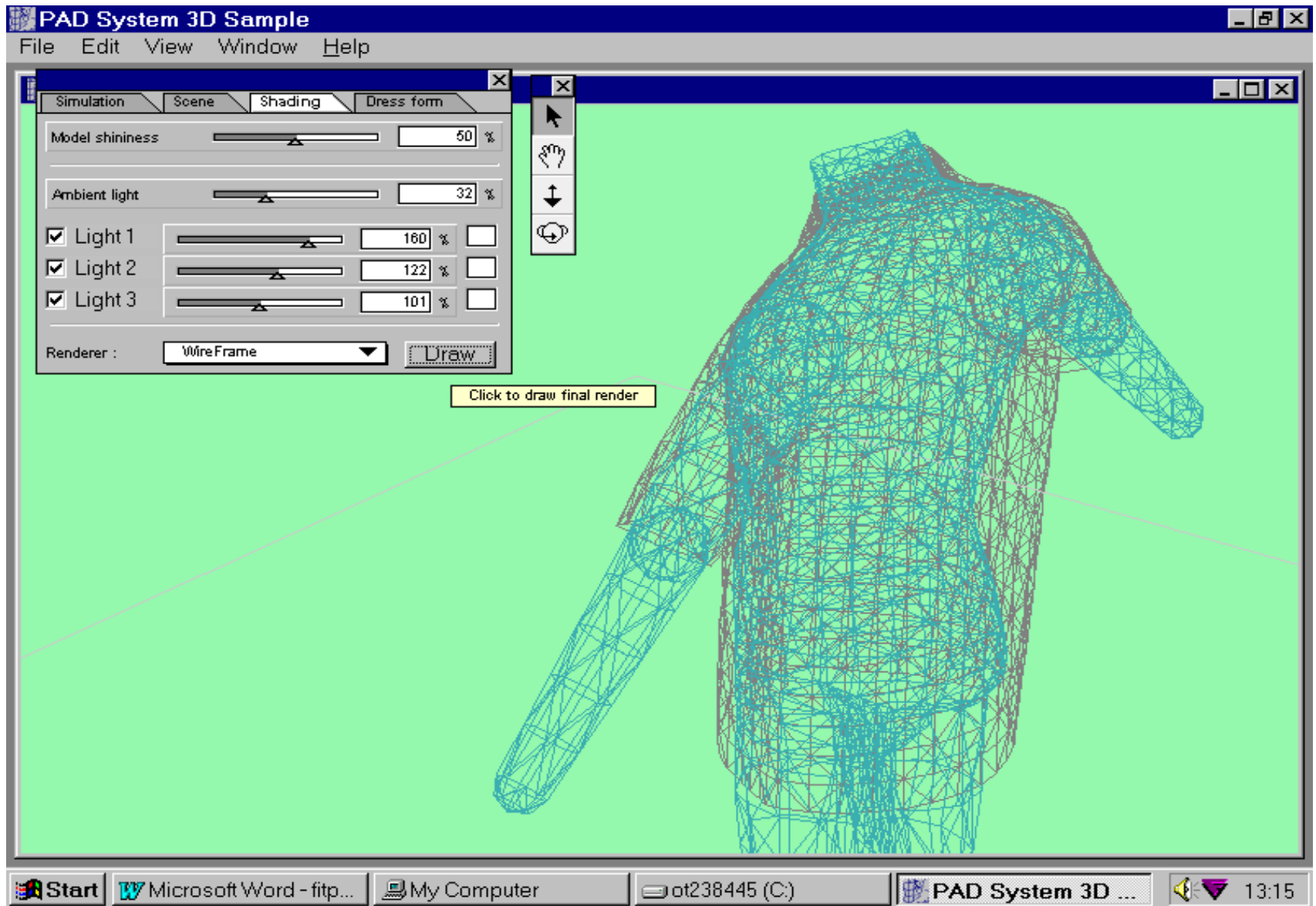
# ADJUSTABLE DIALS FOR SIZING & CUSTOMISATION OF THE 3D MODEL



# 3D SHIRT SIMULATION With PRINT DESIGN MAPPED



# 3D SIMULATION OF FIT & DRAPE



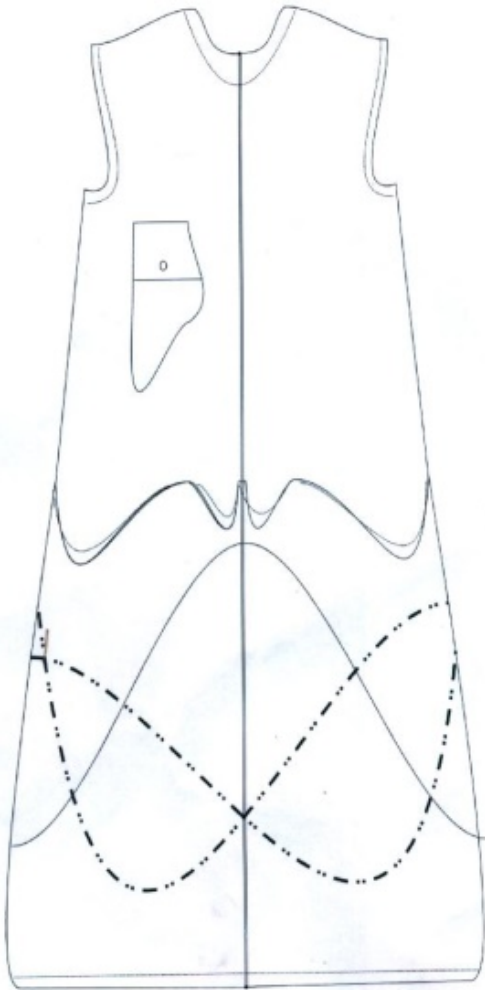
“...the most straight forward way  
of taking 2D data  
and presenting it  
as 3D data  
is to use a 3D model.”

Jones, P (June 1994) 'Development of  
State of the Art Mannequin'  
*Apparel International*.

**MMU:**  
**3D Software**  
**Design Research**  
**1998-2000**

**3D EXPERIMENTS**

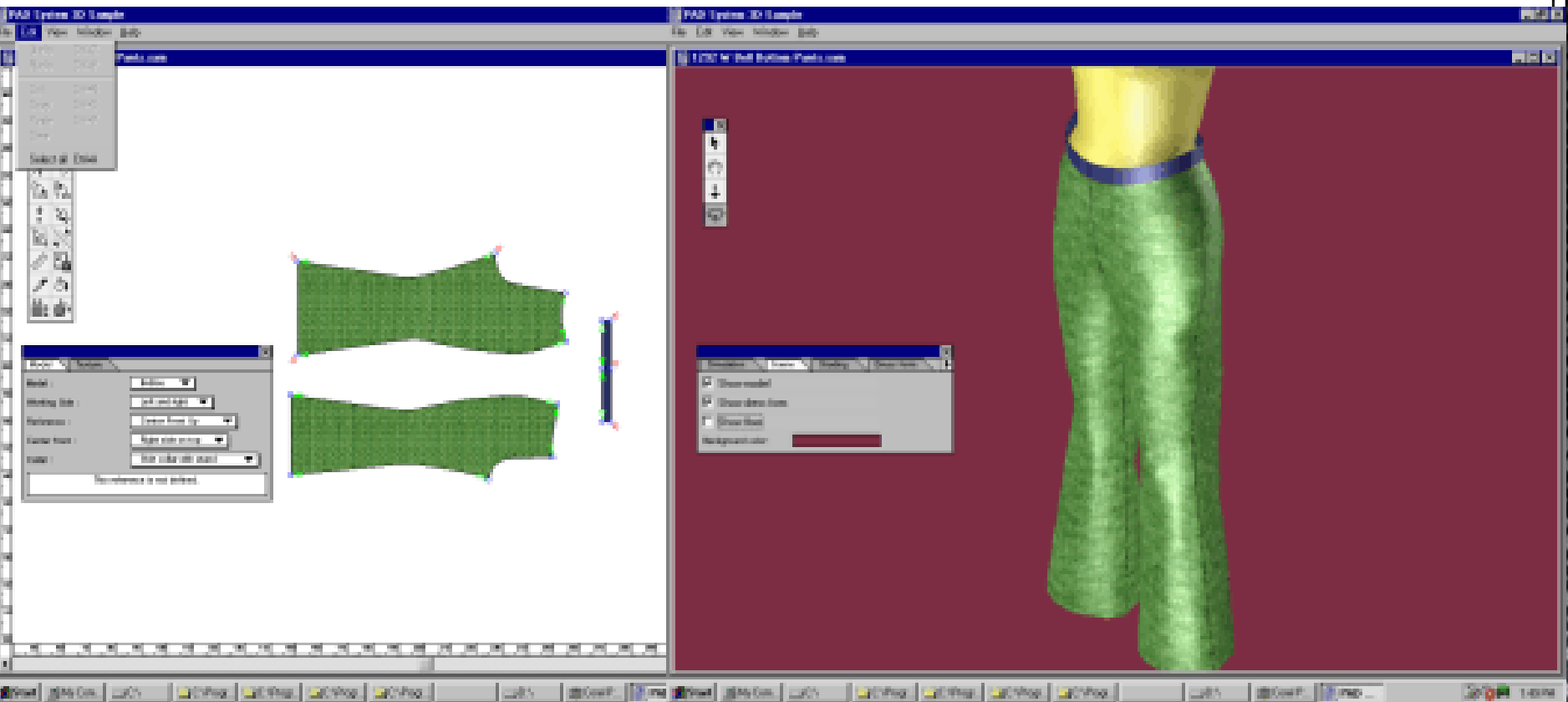
# 2D working drawings



Corel Draw 9  
graphics drawing, painting  
software

Taylor, A. 1999.  
Department of clothing design & Technology

# FITTED TROUSERS WITH PRINT/TEXTILE MAPPED TO PATTERN IN 2D & 3D in PAD SOFTWARE

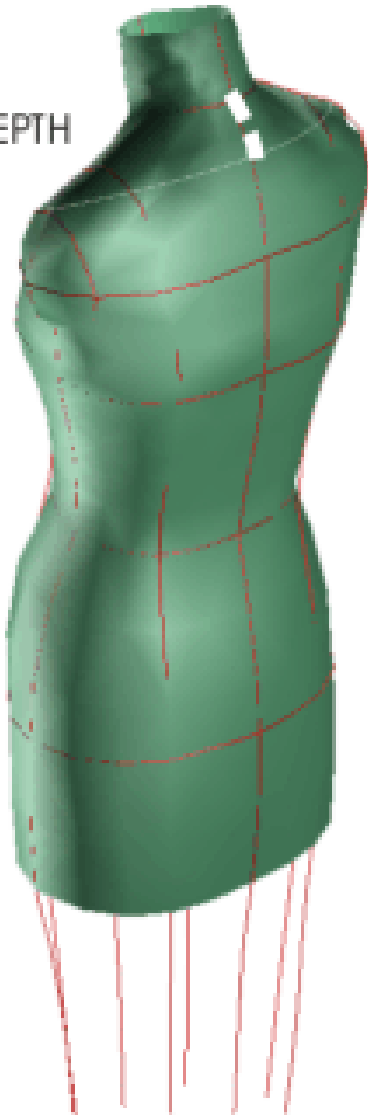


Taylor, A. 1999. 3D textile mapping experiments  
Department of clothing design & Technology. MMU

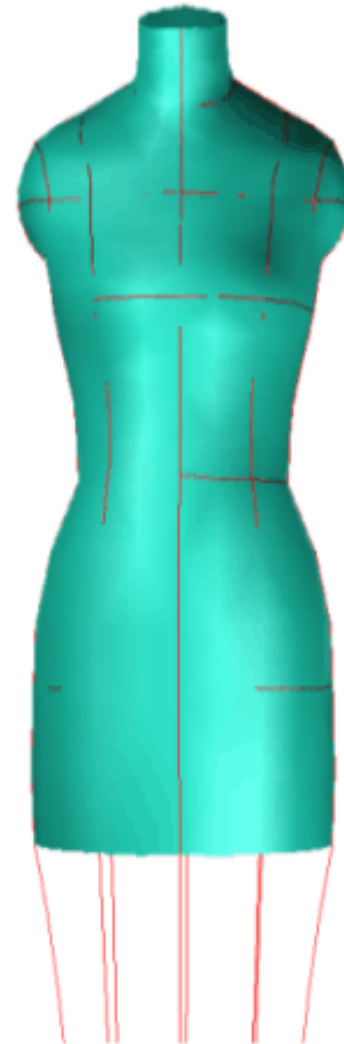
# BACK BODICE DRAFTING MEASUREMENTS

Development Animated  
3D learning tools  
using PAD Software

ACROSS BACK  
CENTRE BACK DEPTH

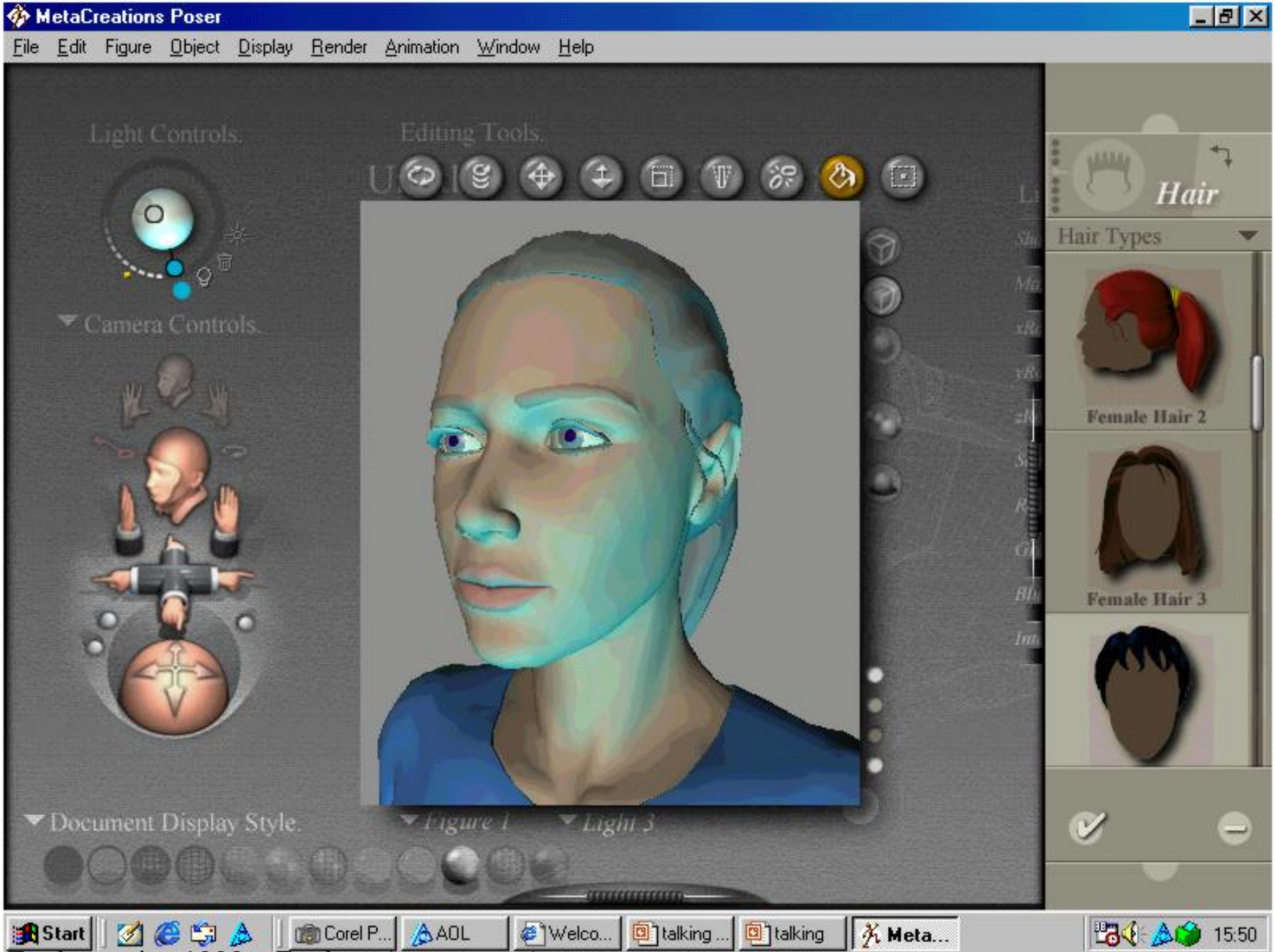


FRONT VIEW

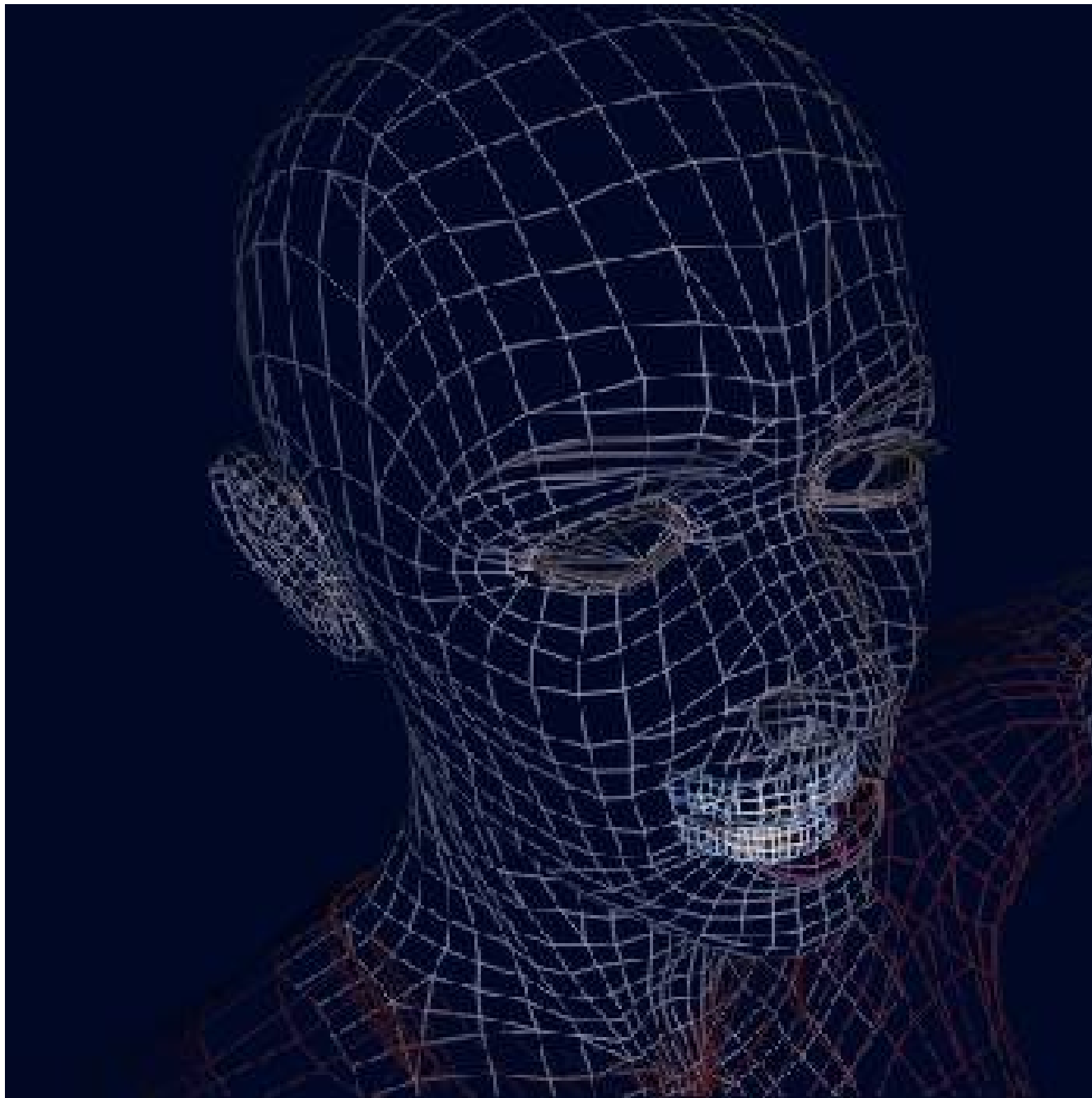


Taylor, A. 1999. 3D textile mapping experiments  
Department of clothing design & Technology. MMU

DRESS FORM/WORK ROOM STAND



Taylor, A. 1998. Evaluation experiments with Poser. Department of clothing design & Technology. MMU



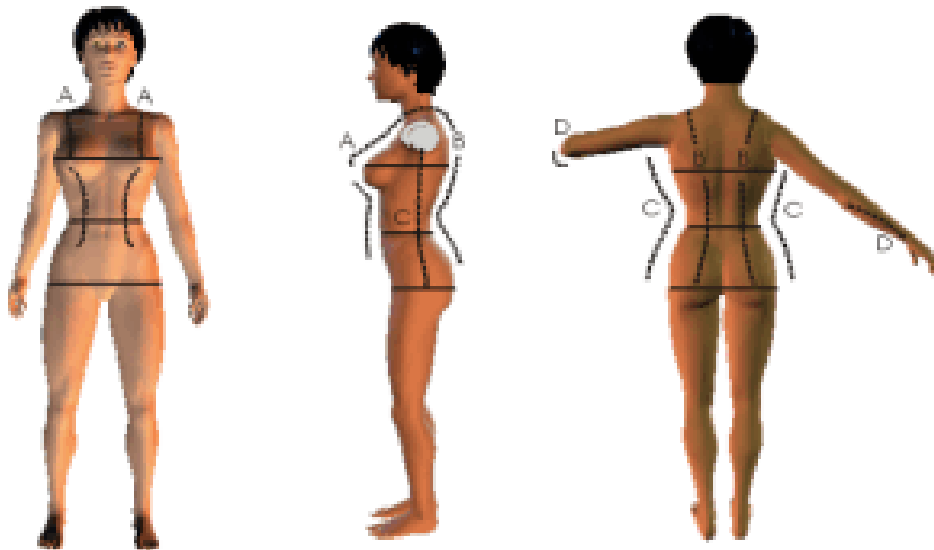
Taylor, A. 1998.  
Evaluation  
experiments  
with Poser.

Department of  
clothing design &  
Technology. MMU

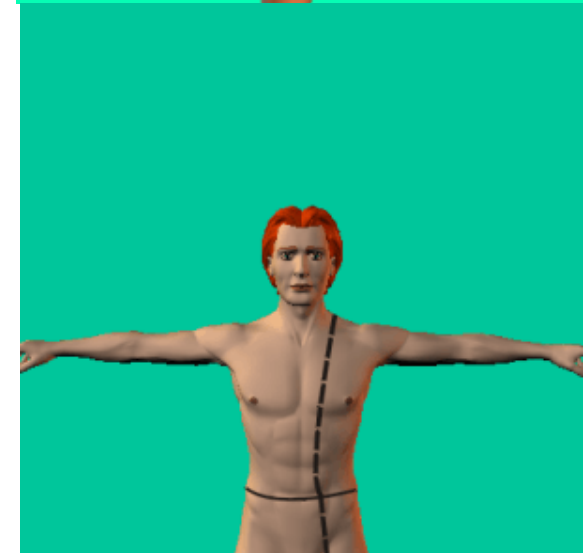
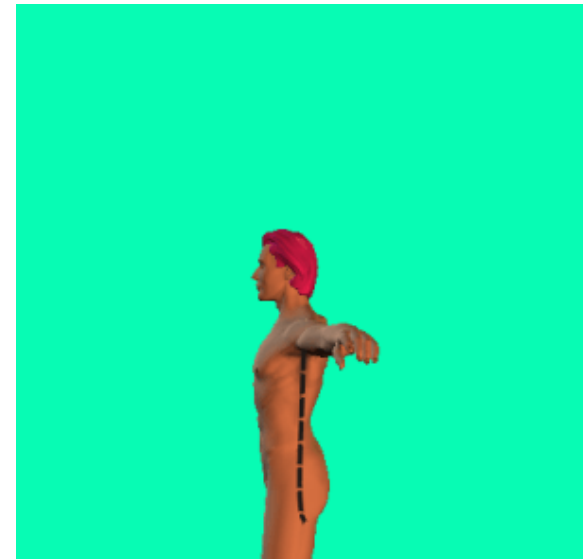
# POSER4 AS A LEARNING TOOL

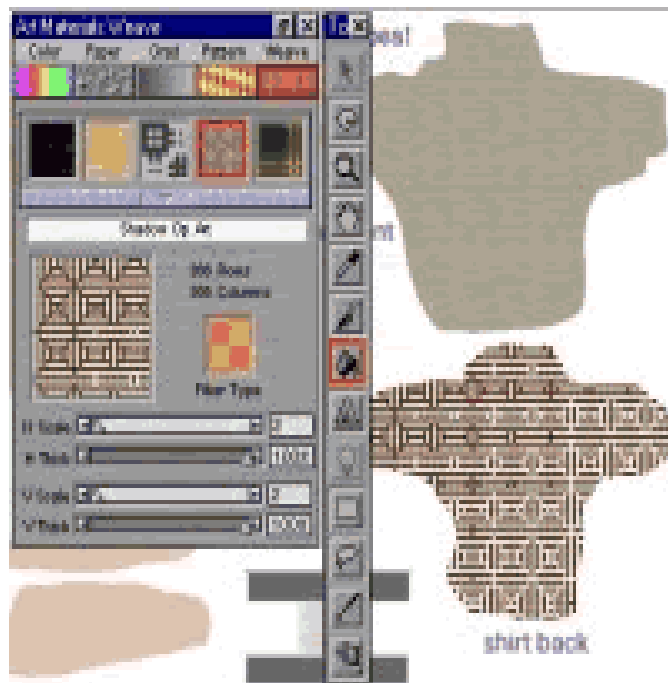
Taylor, A. 1999. 3D Areas of suppression visualisation experiments  
Department of clothing design & Technology. MMU

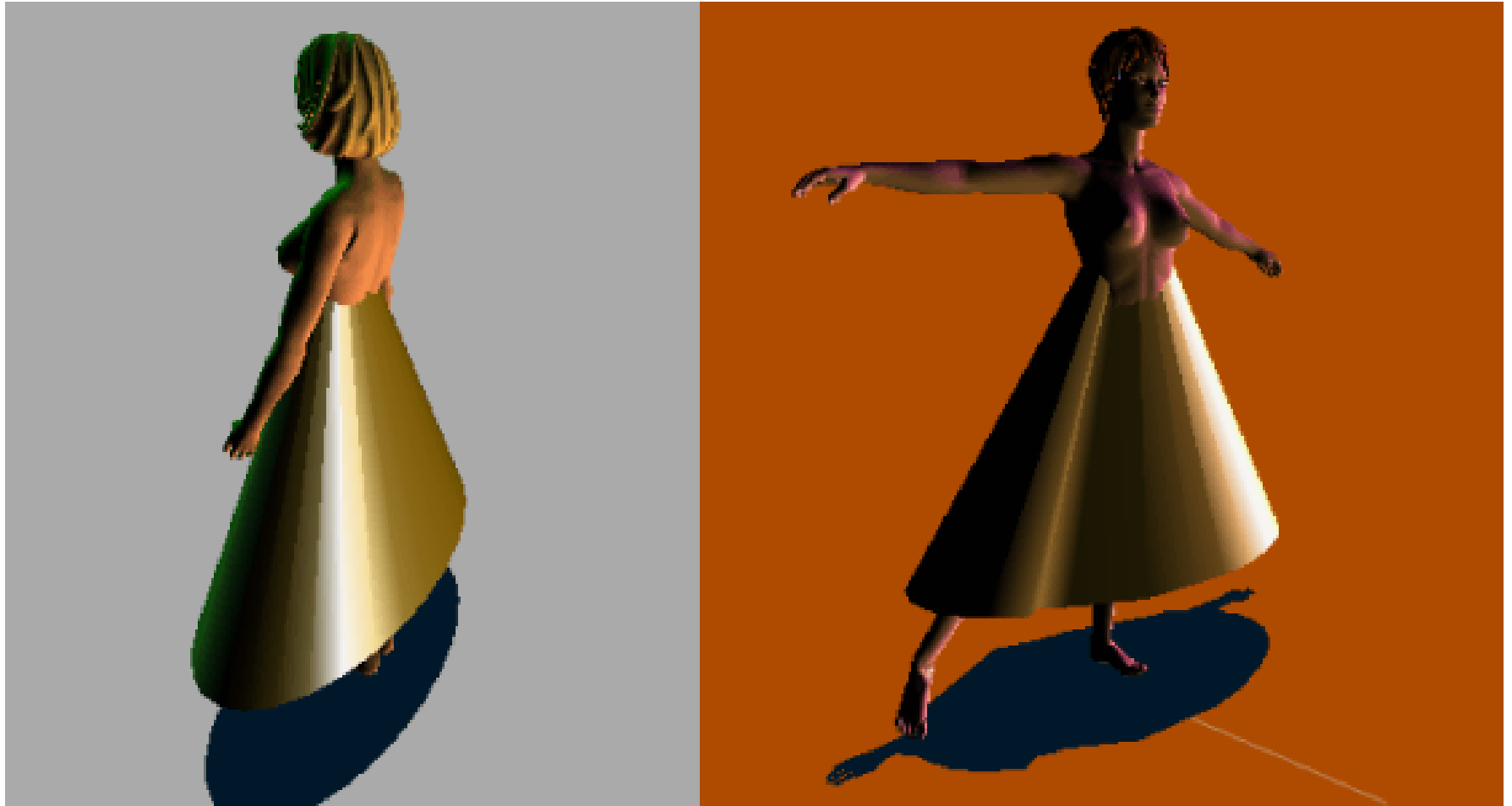
## AREAS OF SUPPRESSION FOR BASIC BLOCK PATTERNS



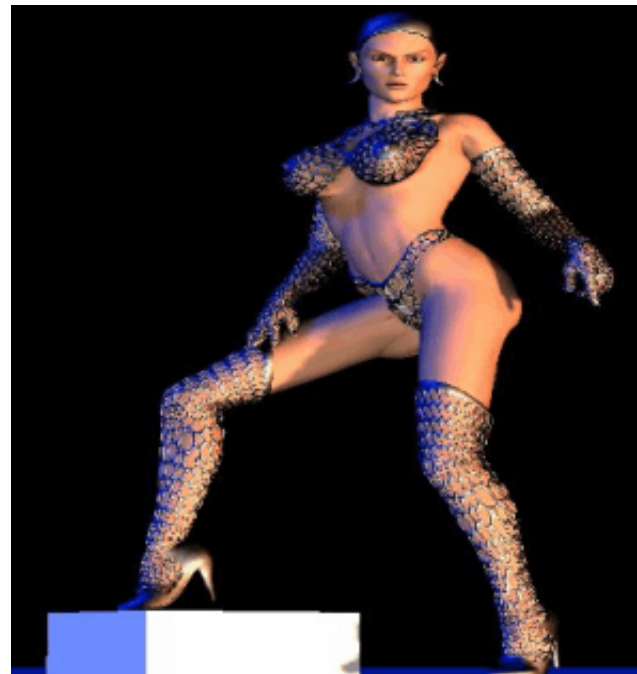
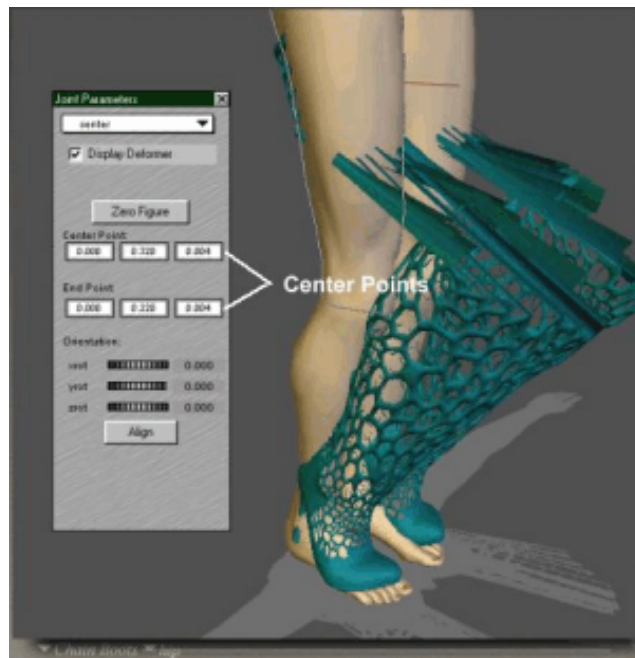
- A) Above and under the bust prominence
- B) Above and under the shoulder the blade
- C) Between underarm and side hip
- D) At the elbow or between the elbow and wrist







Taylor, A. 1999. 3D modelling experiments using primitive shapes and Poser software.  
Department of clothing design & Technology. MMU



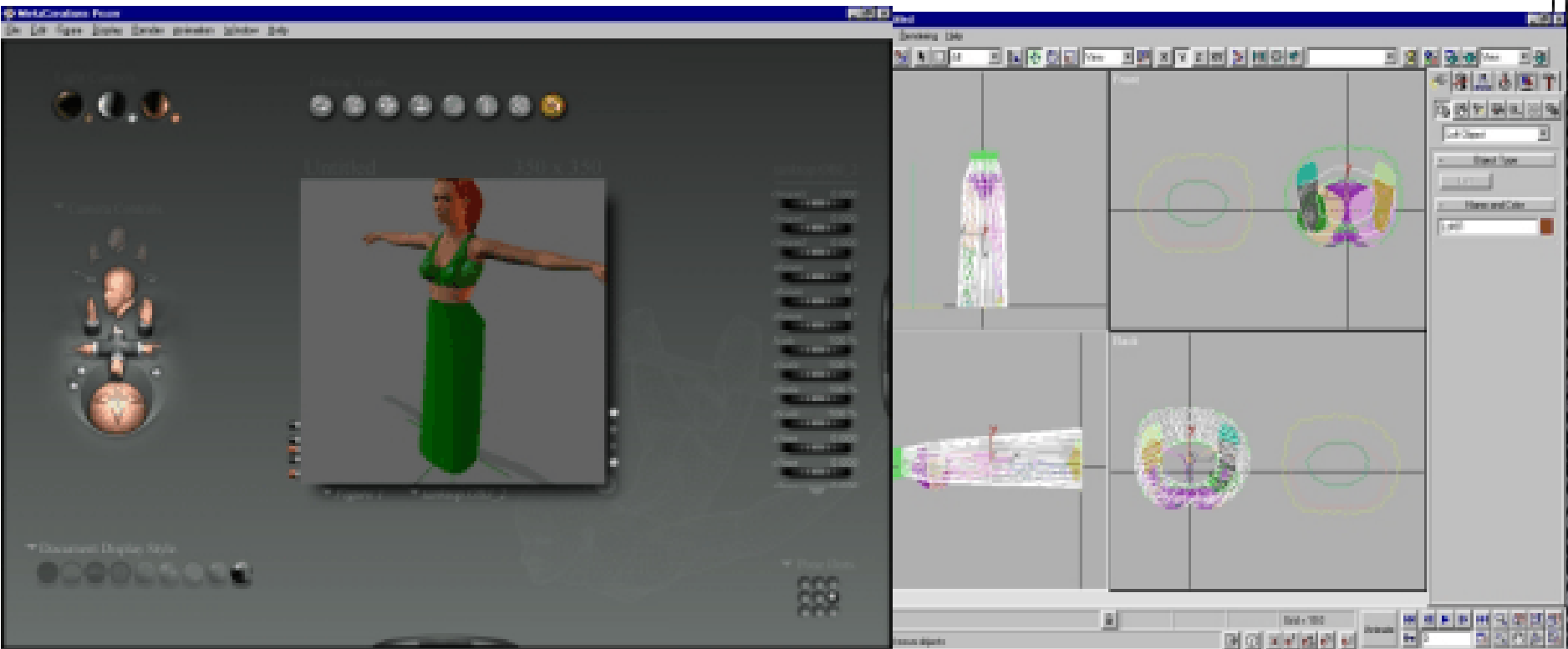


## POSER 4+ LIGHTWAVE 3D

Taylor, A. 1999.  
3D animation hoody visualisation.  
Department of Clothing Design &  
Technology. MMU



# +POSER 4+3D STUDIO MAX+

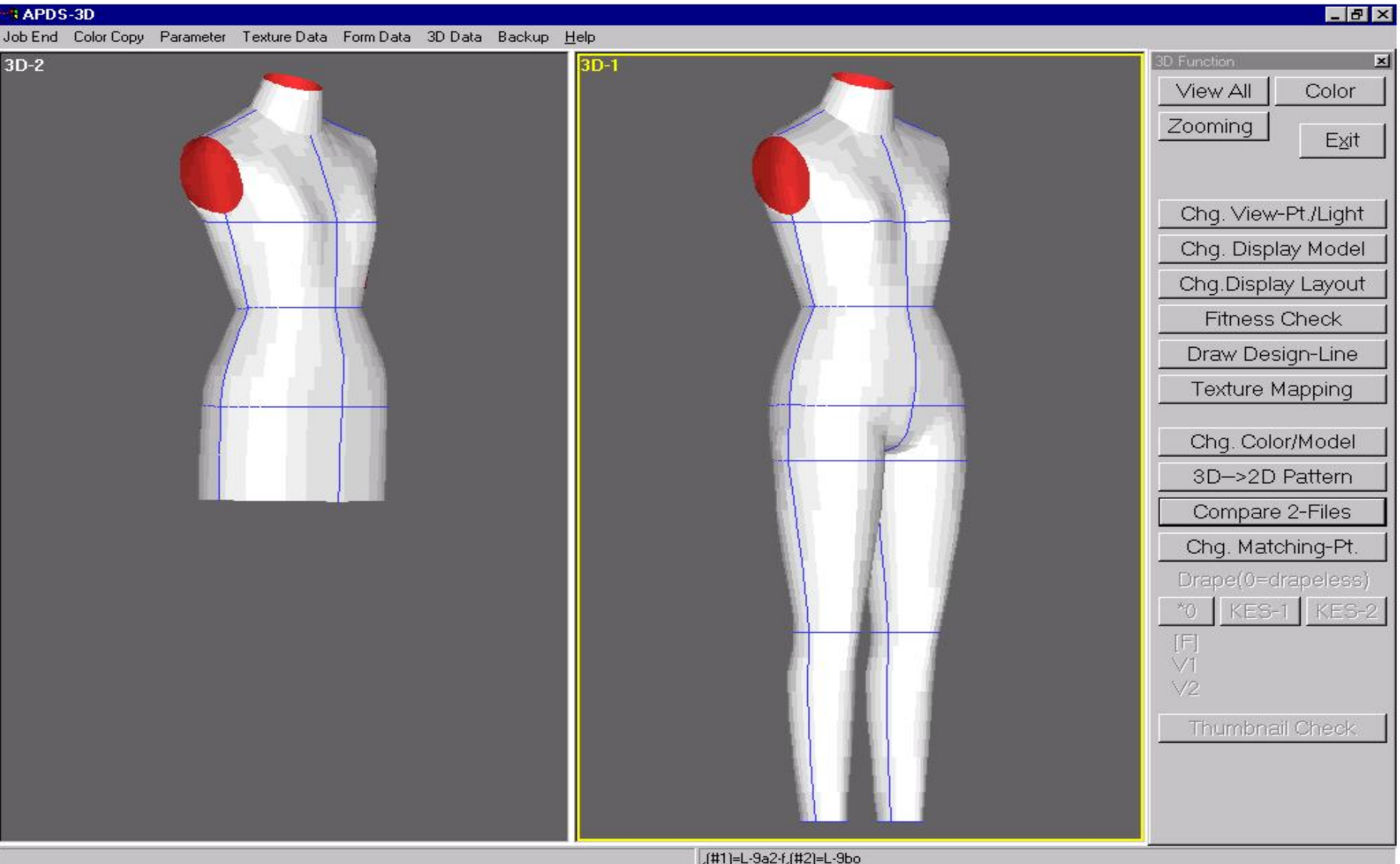


# MMU:

## 3D Software Design Research 1998-2000

FINAL PHASE  
EVALUATION OF  
GERBER AP3DS  
3D -2D DESIGN, FIT &  
KES\_FABRIC  
MEASUREMENT

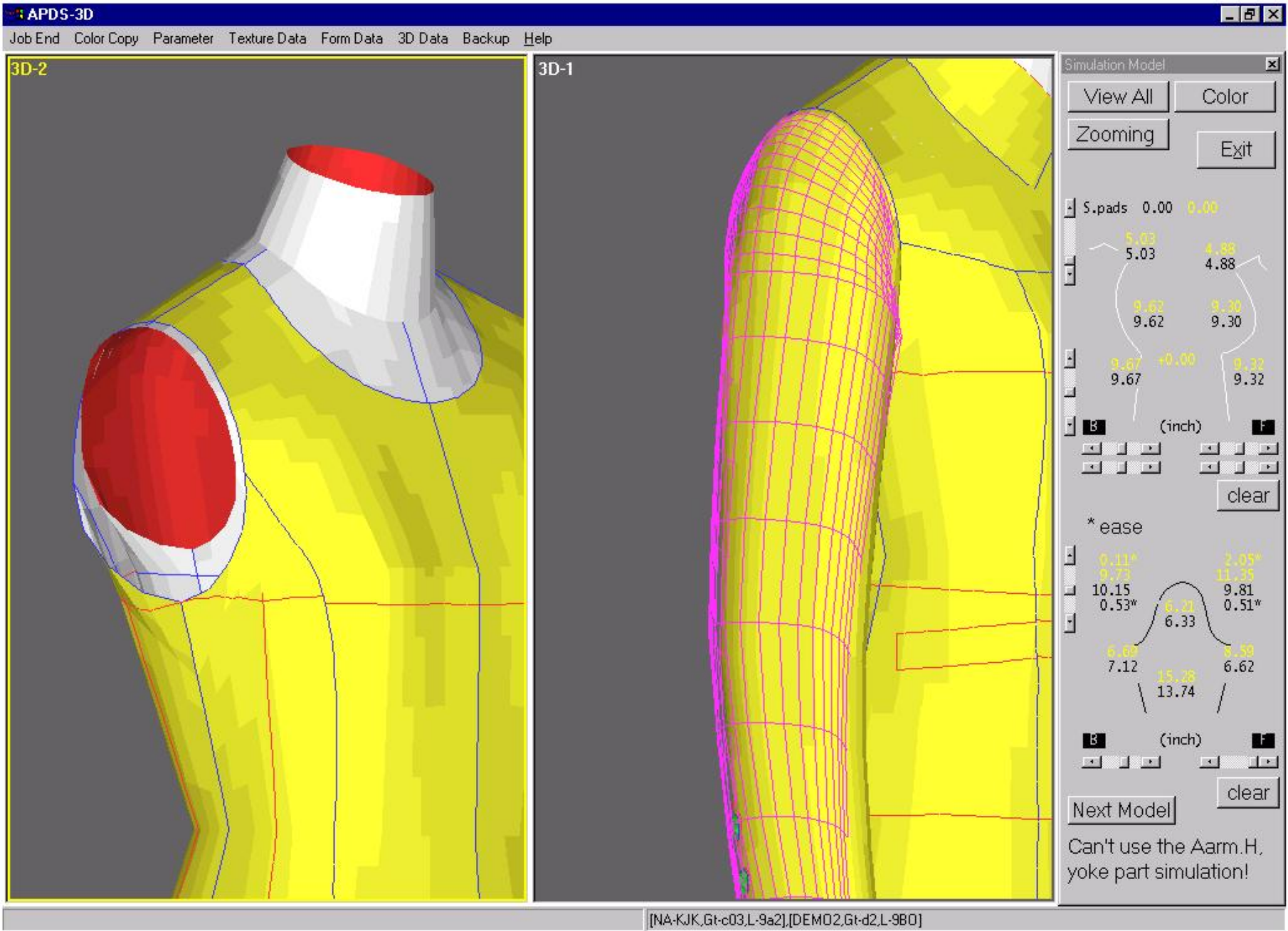
# GERBER AP3D-S 3D MODULE WITH ACCUMARK PDS 2000



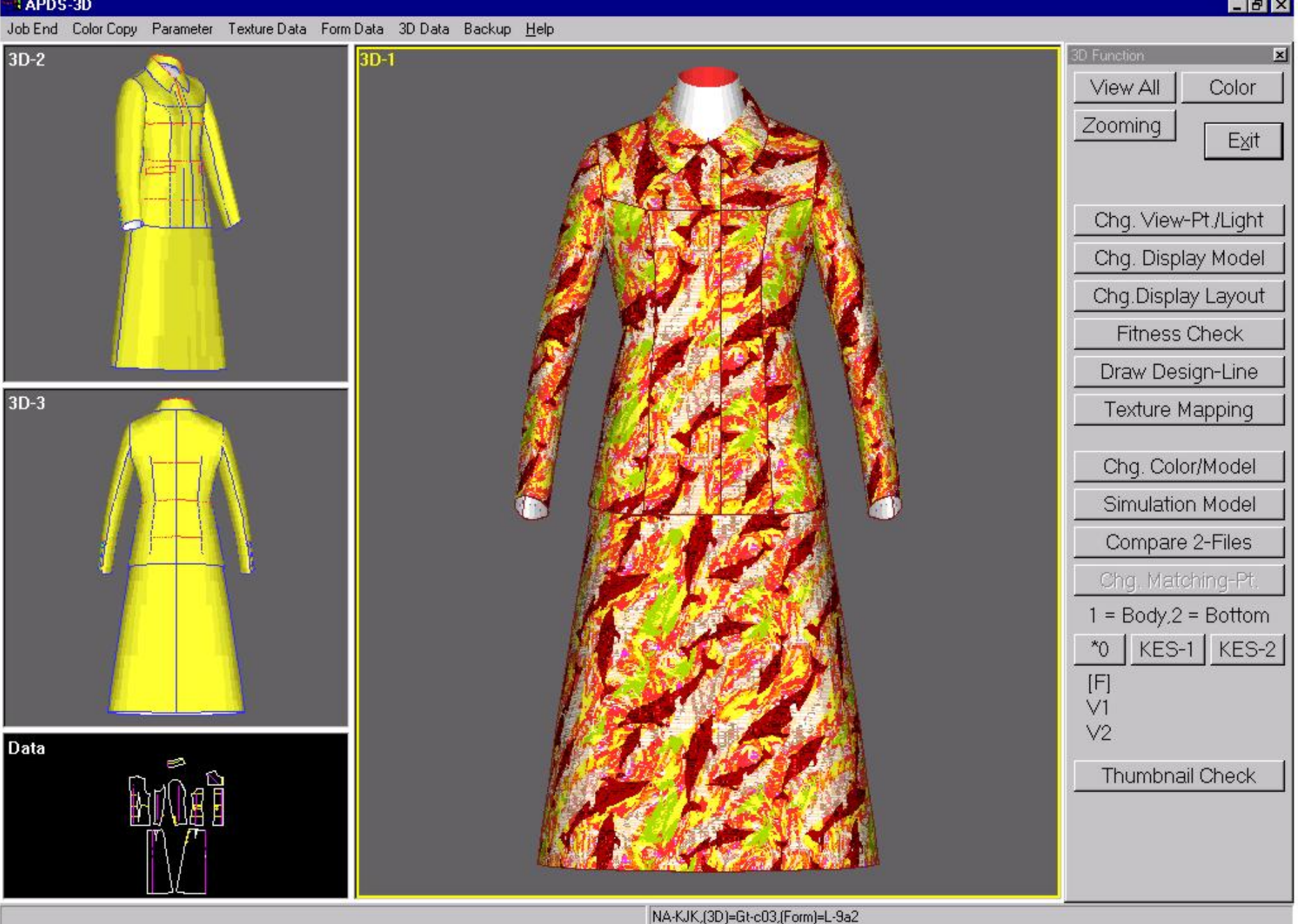
Taylor, A. 2000. 3D Gerber AP3D-S experiments with 3D-2D pattern  
Department of Clothing Design & Technology. MMU



Taylor, A, 2000. Evaluation experiments with Gerber 3D blocks  
 Department of Clothing Design & Technology. MMU



Taylor, A. 2000. Evaluation experiments with Gerber 3D ease and fit tools  
Department of Clothing Design & Technology. MMU



Taylor, A. 2000. Experiments with Print Placement In Gerber 3D.  
Department of Clothing Design & Technology. MMU

MMU:  
3D Software  
Design Research  
2000-

FUTURE PHASE



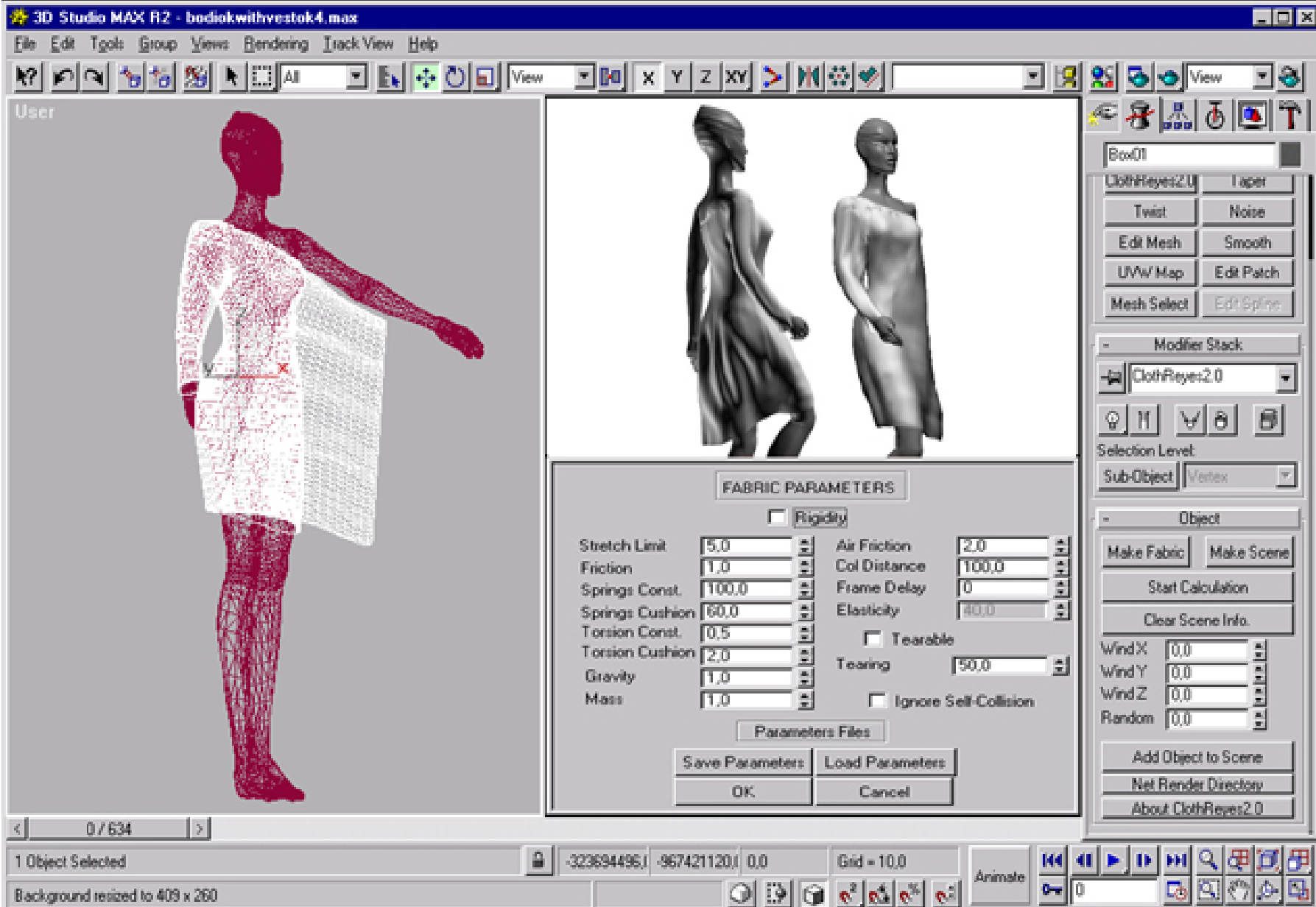
Artificial Sweeteners

Firetrap

females

3D Studio Max and ClothReyes collaboration  
- Catwalk simulation by  
Thierry Mugler





**ClothReyes ClothReyes ClothReyes**



**FABRIC PARAMETERS**

☐ Rigidity

Stretch Limit	5,0	Air Friction	2,0
Friction	5,0	Col Distance	100,0
Springs Const.	30,0	Frame Delay	0
Springs Cushion	10,0	Elasticity	40,0
Torsion Const.	2,0	<input type="checkbox"/> Tearable	
Torsion Cushion	2,0	Tearing	50,0
Gravity	0,5	<input type="checkbox"/> Ignore Self-Collision	
Mass	1,0		

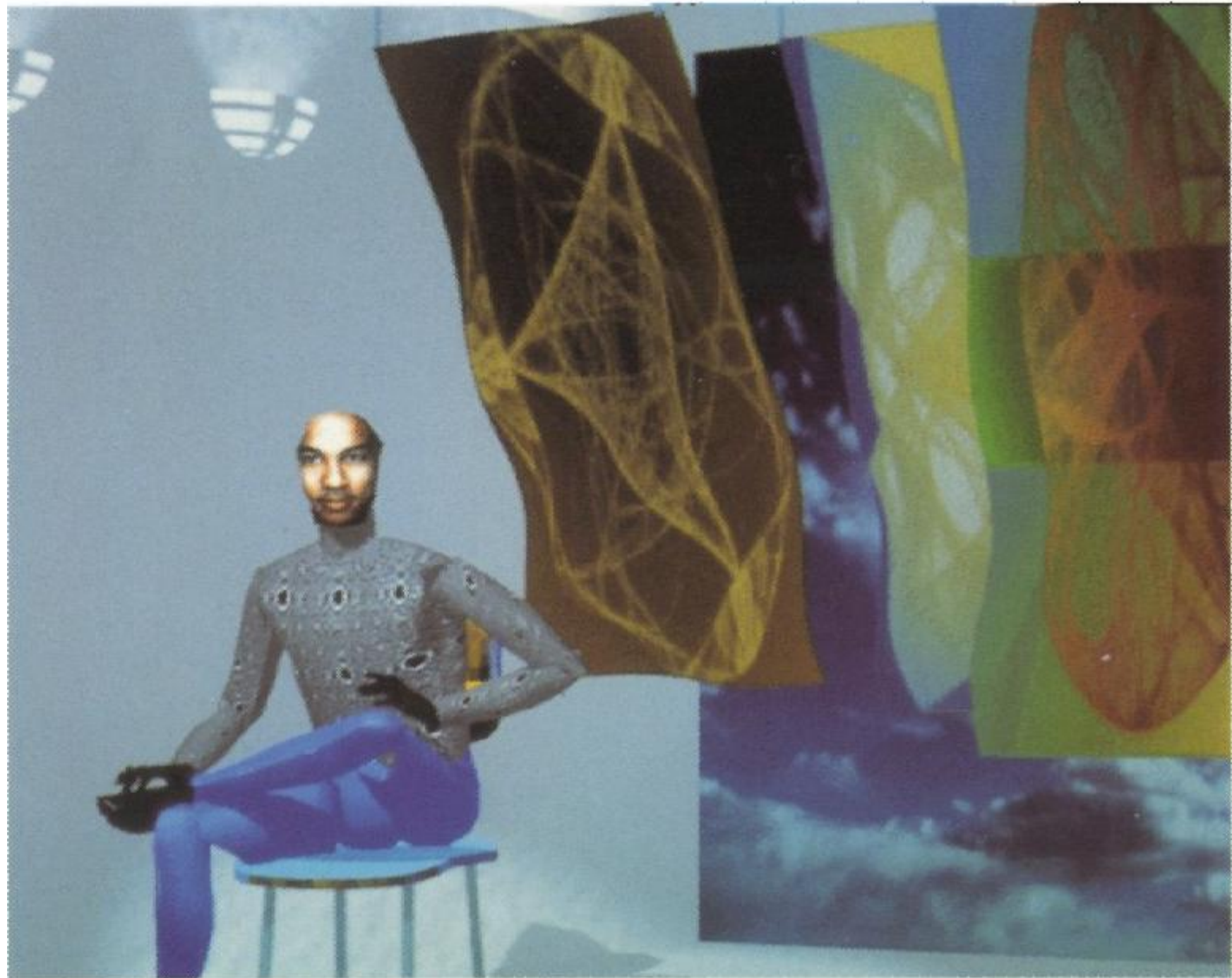
**Parameters Files**

Save Parameters	Load Parameters
OK	Cancel



## Virtual Reality:

The ultimate future textile design experience?



“If the artist does not perfect  
a new vision  
in his process of doing,  
he acts mechanically and repeats some  
old model  
fixed like a blue print in his mind”

John Dewey, (1935) Art as Experience, p. 50

in  
Strauss, A Corbin, J  
Basics of Qualitative Research-  
Grounded Theory Procedures and Techniques

“Minds are like  
Parachutes  
they only function  
when they are open”

Sir James Dewar