

---

# List of Figures

---

## Chapter 1

Figure 1.1 Epidermis of human skin x500 .....	1-2
Figure 1.2 Micrograph of human skin x40 .....	1-3
Figure 1.3 A Junctional Naevus .....	1-8
Figure 1.4 A Compound Naevus.....	1-9
Figure 1.5 An Intradermal Naevus .....	1-10
Figure 1.6 A Dysplastic Naevus.....	1-10
Figure 1.7 A Cellular Blue Naevus.....	1-12
Figure 1.8 A Pigmented Basal Cell Carcinoma .....	1-17
Figure 1.9 A Seborrheic Keratosis .....	1-18
Figure 1.10 Summary of Carcinogenesis in Cutaneous Melanoma .....	1-26
Figure 1.11 A Superficial Spreading Melanoma .....	1-27
Figure 1.12 Nodular Melanoma .....	1-28
Figure 1.13 Survival with increasing primary tumour thickness.....	1-33

## Chapter 2

Figure 2.1 Malignant Melanoma .....	2-4
Figure 2.2 Skin Surface Microscopy .....	2-7
Figure 2.3 Surface microscopy of superficial spreading melanoma.....	2-9
Figure 2.4 Surface microscopy .....	2-10
Figure 2.5 Surface microscopy .....	2-10
Figure 2.6 Surface microscopy .....	2-11
Figure 2.7 The confocal principle.....	2-15
Figure 2.8 Obtaining a silhouette of a melanoma by a simple thresholding technique .....	2-18
Figure 2.9 Computer generated lesions demonstrating edge blur .....	2-19
Figure 2.10 Spectral frequency diagram.....	2-23
Figure 2.11 Refraction & Reflection.....	2-23
Figure 2.12 Spectral response curves for human cone cells.....	2-24
Figure 2.13 The RGB Colour Space .....	2-25
Figure 2.14 HSV colour space .....	2-26
Figure 2.15 Absorption spectra of human melanins <i>in vivo</i> and <i>in vitro</i> .....	2-27
Figure 2.16 The Kubelka-Munk theory – a schematic representation .....	2-30
Figure 2.17 Graph demonstrating curved surface for all possible colours of human skin in the RGB colour space.....	2-32
Figure 2.18 Melanin and blood SIAGraphs of melanoma seen in fig 2.1 .....	2-33
Figure 2.19 Effect of the presence of dermal melanin .....	2-34
Figure 2.20 Effect of altering the thickness of the papillary dermis on the colour surface .....	2-35

Figure 2.21 Picture of a SIAscope .....	2-37
Figure 2.22 Screen shot from the SIAscope.....	2-37
<b>Chapter 3</b>	
Figure 3.1 Dermatophot & 35mm macrophotography system.....	3-3
Figure 3.2 (a-d) Artefacts in SIAgraphs .....	3-6
Figure 3.3 Examples of SIAscopy Features .....	3-15
Figure 3.4 Hypothetical ROC Curve .....	3-20
Figure 3.5 Log Odds Combinations .....	3-27
Figure 3.6 Schematic diagram showing the process of stepwise logistic regression.....	3-28
Figure 3.7 Hypothetical egg-sizing machine.....	3-34
Figure 3.8 Classification tree for patients having a myocardial infarction.....	3-36
Figure 3.9 Two hypothetical data series that illustrate the power & shortcomings of classification trees .....	3-37
Figure 3.10 Classification tree produced from hypothetical dataset 1.....	3-38
Figure 3.11 Classification tree derived from hypothetical dataset 2.....	3-39
<b>Chapter 4</b>	
Figure 4.1 Scatter Plot of SIAscope v. Mexameter - Hb Inner Arm.....	4-5
Figure 4.2 Scatter Plot of SIAscope v. Mexameter - Hb Outer Arm .....	4-5
Figure 4.3 Scatter Plot of SIAscope v. Mexameter - Melanin Inner Arm.....	4-6
Figure 4.4 Scatter Plot of SIAscope v. Mexameter - Melanin Outer Arm .....	4-6
Figure 4.5 Change in Blood SIAgraphs with time during heavy exercise from 2 volunteers....	4-9
Figure 4.6 Comparison of Collagen SIAgraph with Histology.....	4-12
Figure 4.7 Distribution of Lesions Containing Dermal Melanin with Age.....	4-16
<b>Chapter 5</b>	
Figure 5.1 Intra-observer agreement – Kappa scores.....	5-3
Figure 5.2 Inter-observer agreement – Kappa scores.....	5-3
Figure 5.3 Brightness-intensity plot for the human visual system .....	5-5
Figure 5.4 Melanomas With & Without Collagen Holes by Clark's Level .....	5-10
Figure 5.5 Comparisons of ROC Curves .....	5-17
Figure 5.6 Distribution Of Melanomas by Age .....	5-19
Figure 5.7 Odds for Logistic Regression Model By Age.....	5-22
Figure 5.8 ROC Curve for Forward Selection Model.....	5-29
Figure 5.9 Comparison of Skin Surface Microscopy with Predictive Models.....	5-30
Figure 5.10 Classification Tree with High Specificity.....	5-33
Figure 5.11 Classification Tree with High Sensitivity.....	5-34
Figure 5.12 QUEST Classification Tree.....	5-37

**Chapter 6**

Figure 6.1 3-D topographical map generated from collagen SIAgraph of a BCC ..... 6-7

**Appendix A**

Figure A.1 QUEST Classification Tree ..... A-2

**Appendix B**

Figure B.1 SIAgraphs of a superficial spreading melanoma ..... B-2

Figure B.2 SIAgraphs of a superficial spreading melanoma ..... B-3

Figure B.3 SIAgraphs of a compound naevus ..... B-4

Figure B.4 SIAgraphs of an intradermal naevus ..... B-5

Figure B.5 SIAgraphs of an *in situ* superficial spreading melanoma ..... B-6

Figure B.6 SIAgraphs of a blue naevus ..... B-7

Figure B.7 SIAgraphs of a seborrheic keratosis ..... B-8