

## Contents

<i>About the authors</i>	page ix
<i>Preface</i>	xi
<i>Acknowledgments</i>	xiv
<b>1 Extracting information from spectral images</b>	<b>1</b>
1.1 Introduction	1
1.2 Field studies and spectral images	3
1.3 Photo interpretation of spectral images	7
1.4 Spectral analysis of images	19
1.5 Testing and validating results	27
1.6 Summary steps for extracting information	35
<b>2 Spectroscopy of landscapes</b>	<b>39</b>
2.1 Basics of spectroscopy for field investigators	39
2.2 Spectroscopy at landscape scales	52
2.3 Spectroscopy applied to images	60
<b>3 Standard methods for analyzing spectral images</b>	<b>65</b>
3.1 Initial evaluation	65
3.2 Calibration	70
3.3 Enhancement for photo interpretation	81
3.4 Data reconnaissance and organization	84
3.5 Physical modeling with spectral data	112
<b>4 Spectral-mixture analysis</b>	<b>126</b>
4.1 Endmembers, fractions, and residuals	128
4.2 Shade	135
4.3 Fraction images	137
4.4 Finding endmembers	145
4.5 Calibration feedback	159
4.6 Nonlinear mixing	164
4.7 Thermal-infrared images	165
<b>5 Fraction images of landscapes</b>	<b>168</b>
5.1 What to do with fraction images	168
5.2 Classification using endmember fractions	183

<b>6</b>	<b>Target detection</b>	192
6.1	Spectral contrast and target detection	192
6.2	Detection limits	224
6.3	Spectral contrast and spatial scale	237
<b>7</b>	<b>Thematic mapping of landscapes</b>	244
7.1	Field maps and image-derived maps	244
7.2	Thematic mapping with spectral images	250
<b>8</b>	<b>Processes and change</b>	298
8.1	Process pathways in spectral images	298
8.2	Reference pathways	312
8.3	Mapping changes in landscapes	324
	<i>Glossary</i>	337
	<i>Reference</i>	350
	<i>Index</i>	357