

Contents

Introduction 1

Scaling Laws 3

Elastic Deformations 5

Thin Films 9

Conductor Paths 21

Membranes 29

Strain Gauges on Membranes 53

Beams 65

Vibrations 85

Capillaries 107

Capacitive Forces 131

Piezoelectric Effect 137

Thermal Actuators 159

Microoptics 177

Diffusion 191

Microvalves 203

Micropumps 229

Microdosing 251

Analogies of Physical Domains 253

Mechanical Devices for Electronics 261

Pressure Sensors 275

Flow Sensors 289

Inertial Sensors 303

References 311

Index 317