

INDEX

A

- Aberration
 - chromatic 4, 24
- Acousto optic tunable filter (AOTF).....15, 16, 18, 19,
 - 23, 51–52, 56, 71, 154, 156, 168, 169, 283, 286, 322,
 - 323, 332–338, 340, 341, 344, 345, 358, 359, 361,
 - 363–364, 368
- Acquisition2, 5, 17, 19, 23, 27, 28, 36, 39, 51,
 - 53, 59, 66, 77, 100, 135, 139–141, 154, 165, 172, 220,
 - 222, 224, 234, 251, 253, 255, 288, 336, 338, 343, 348,
 - 358, 366, 368, 369, 372
- Actin.....80, 150, 157, 202, 208,
 - 210, 269
- Adult heart 187, 188, 196–198
- Alexa dyes.....18
- Alignment 3, 18, 167, 244, 273–275, 294, 323,
 - 328, 330–331, 334–336, 339, 340, 343, 348, 350,
 - 353–356, 359–361, 364, 368–370
- Alpha..... 127, 220–222, 224, 257, 267, 293
- Angiogenesis149–172
- Antibody.....2, 22, 132, 150, 157, 189, 191, 192,
 - 198, 209, 210, 258, 260, 262, 263, 265, 266, 269, 308,
 - 310, 319
- Anti-fade.....32, 324, 335, 344, 367
- AOTF. *See* Acousto optic tunable filter (AOTF)
- ApoTome.....37
- Area measurement.....280, 282
- Artifact..... 3, 29, 34, 35, 56, 66–68, 79–81, 85, 98, 100,
 - 104, 125, 214–216, 222, 339, 358
- Autofluorescence18, 23, 24, 89, 144, 147, 152, 169,
 - 170, 202, 213, 285, 300
- removal144
- Axial resolution9, 23, 215, 276, 310, 321, 322, 325,
 - 328–330, 333–335, 343, 350, 353, 356, 366, 371

B

- Background 3, 63, 76, 79, 80, 99, 100, 112,
 - 113, 115, 116, 118, 121, 125, 129, 142, 147, 189, 207,
 - 209, 210, 213, 219–220, 222, 224, 261, 275, 276, 280,
 - 283, 285, 314, 315, 319, 329
- Banding..... 120, 186
- Batch processing..... 122–124, 313

- Beads..... 275, 281, 322, 324, 328, 330–335,
 - 337, 343–348, 351, 355, 357, 358, 361, 362, 364–373
- Beam..... 11, 12, 14, 16, 17, 19, 23, 29, 34, 38, 39, 50,
 - 59, 60, 62, 63, 140, 141, 282, 326, 352, 359, 363, 366
- Beamsplitter 139, 141, 143, 160, 167–171
- Bio-format.....44
- Blastoderm25, 29
- Bleed-through18, 56, 58, 59, 64,
 - 66–69, 73, 131, 132, 146, 165, 292, 294
- Blocking buffer189–191
- Blood
 - flow..... 149, 297–303
 - vessels 149, 152–153, 156, 159, 161–166, 168
- Brainbow26, 27
- Bright field 6, 33, 34, 53, 155, 238, 240
- Brightness.....9, 11, 12, 17, 35, 40,
 - 69–71, 79, 83, 98, 99, 102, 105–107, 112, 117, 122,
 - 125, 134, 151, 155, 158, 291
- Buffer 50, 178, 179, 181, 189–191,
 - 194, 198, 204, 239, 258, 259, 261, 263–268, 270, 271,
 - 286
- Butterfly
 - embryo.....179–180
 - wing imaginal disc10

C

- Caenorhabditis elegans*.....3, 5, 17, 177, 257–271
- Caged fluorescent probe36
- Calcein AM.....229, 230, 232–234, 236, 239
- Calcium green31, 288
- Calibration.....20, 28, 98, 140, 282–283, 286, 288, 325, 344
- Cardiac
 - fibroblast.....185
 - myocyte185–199
- CCD. *See* Charged coupled device (CCD)
- Cell
 - division31, 187
 - line..... 150, 151, 159, 208, 227–232, 238, 266
 - periphery.....33
 - profile29
 - viability 30, 37, 229, 232
 - volume 190–192, 194
- Centrosomes.....244, 257, 258, 260, 266, 267, 271

CFP. *See* Cyan fluorescent protein (CFP)
 Chamber.....57, 89, 187, 191, 195, 203, 204, 218,
 222, 232, 250, 262, 263, 266, 269, 312, 313
 Channel
 Charged coupled device (CCD).....15, 37, 62, 63,
 129, 141, 157, 284
 Chromatic aberration 4, 24
 Clearing.....129–147, 155, 163, 218, 223
 CMFDA 190, 192–194
 CMYK. *See* Cyan magenta yellow black (CMYK)
 Colocalization..... 41, 57, 64–66, 108, 115–117,
 144, 322, 324, 325, 333–336, 357, 358
 Color correction 21, 88
 Colorizing 99, 107–111
 Compressed.....78–81, 85, 87, 113, 298
 Condenser 34, 56, 154, 155, 171, 326,
 328, 330
 Conformance.....98, 127
 Contrast.....3, 10, 34, 40, 53, 55, 56, 58, 59,
 78, 79, 82, 84, 98, 105, 116, 118–120, 125, 151, 155,
 158, 159, 162, 164, 171, 185, 202, 219–220, 222, 224,
 237, 238, 270, 275–276, 282, 310, 338, 340, 346, 359,
 360, 364, 365
 Correlative microscopy.....34
 Coverslip21, 27, 29, 33, 34, 38, 181, 191–193,
 195, 198, 203, 205, 214, 217–219, 223, 233, 235, 246,
 252, 274, 277, 278, 294, 312, 319, 326
 Cross-excitation..... 130–135, 145, 292
 Crosstalk..... 66, 165, 292
 Culture 15, 29, 34, 150, 154, 185,
 189–199, 227–229, 234, 236, 239, 240, 246, 259,
 264, 267, 306–313, 317–319
 Curves 75, 77, 81, 84, 112–119, 125,
 138, 145, 146, 159, 168, 207, 275, 283, 284, 286–288,
 291–294, 306, 330, 343, 364
 Cuticle.....180, 181, 204, 205, 260
 Cyan fluorescent protein (CFP) 18, 35, 69,
 71, 143, 146, 169–171
 Cyanine-5.....25, 41
 Cyan magenta yellow black (CMYK) 101, 102, 107,
 111, 114, 118–119, 126
 Cytoskeleton.....17, 202, 246, 257–271

D

Dark field 33, 34
 Deconvolution 37, 160, 220, 324
 Depth measurement 276–278
 Development 2, 6, 11, 14, 17,
 18, 22, 28, 30, 35, 36, 39, 40, 43, 51, 84, 89, 147, 185,
 187, 196, 197, 243, 263, 267, 306, 319
 Dialogue box 101, 106–109,
 111–113, 117, 120–123, 125–127
 DIC. *See* Differential interference contrast (DIC)
 Dichromatic mirror 12, 13, 16, 73

Differential interference contrast (DIC)..... 34, 36,
 53, 56–58, 79, 82, 84, 138, 146, 155, 170, 171, 233,
 234, 237, 238
 Digital video 34, 73, 77, 85–89
 DiI..... 156, 159, 161, 162, 165, 166
 Diode.....20, 53, 54, 61, 62, 288, 327, 348, 349, 358
 Dissection..... 178, 202–204,
 218, 264, 268, 270, 307–309, 311, 312, 318
 Double label 40–42
 Drosophila.....22, 25, 26, 29, 31,
 42, 177, 178, 201–211, 217, 243–255
 Drugs.....192, 228, 229, 243–255
 DsRed 20, 32, 151, 155, 159, 170–172, 231
 DVD 43, 87, 113, 160
 Dynamic range 36, 63, 72, 99–100, 224, 285, 362

E

Electronic filters 18
 Electron microscopy 34, 39, 188, 205, 216
 Embryo..... 3, 5, 16, 17, 22, 25, 26, 29,
 31, 35, 36, 39, 178–181, 183, 189–191, 194–198,
 202, 243–255, 257, 271, 308, 309, 319
 Embryonic heart..... 190, 194, 197, 198
 Emission..... 12, 15, 19, 20, 23–25, 30, 35, 41, 50, 56,
 58–60, 62–70, 73, 108, 130–136, 138–140, 142–145,
 147, 154, 160, 161, 163–165, 167, 169–171, 233,
 270, 283–287, 289–193, 319, 322, 323, 332–334,
 338, 343, 353, 357, 358, 361, 367, 372
 fingerprinting 142
 Epifluorescence.....2, 4, 10, 15, 17, 36–38, 41, 228, 319
 Epithelium 29, 42, 306
 Evanescent wave 39
 Evo-Devo.....177
 Excitation 4, 12, 56, 130, 149, 214, 231, 270, 283, 323

F

F-actin..... 186, 187, 196, 210
 Fading.....32, 192
 Fiber optic 34, 322, 339–340, 344, 355, 358, 360
 Field
 illumination 170, 321–323, 326,
 327, 349–353, 357, 362, 371
 Filter..... 1, 16, 18, 19, 23, 32, 41, 52, 56, 57, 66–69, 73,
 111, 112, 119, 120, 132–134, 140, 144, 147, 154, 155,
 157, 159, 160, 165, 169–171, 203, 219, 220, 223, 231,
 237–239, 270, 275, 283, 285, 286, 299, 308–310,
 312, 322, 327, 336–339, 346, 353, 361, 363–366
 Filter wheel..... 23, 139, 140, 286
 Final Cut Pro..... 43, 88
 Fingerprint 142
 Fixation 1, 3, 34, 157, 165, 179–181, 189, 197,
 202–204, 209, 260–266, 268–270, 307–309, 312
 Flatness of field 21
 FLIM. *See* Fluorescence lifetime imaging (FLIM)

- Fluorescein 2, 10, 20, 25, 32, 41, 150, 152, 155, 157–161, 163, 168–172, 230, 270, 287, 289, 351
- Fluorescence
- cross excitation..... 130–135
 - crosstalk..... 66
 - labeling..... 164, 232–236
 - lectin..... 162, 163
 - lifetime..... 6, 7, 35, 36, 282, 287–294
 - lifetime imaging (FLIM)..... 35–36, 167, 287–291, 294
 - measurement..... 35, 62, 104, 237, 282–287
 - photoactivation localization..... 39
 - probes 9, 16, 18, 23, 25, 30, 35, 36, 41, 65, 68, 70, 147, 227, 229–231, 233, 238, 239, 243, 244, 282
 - protein 3, 18, 30, 32, 35, 57, 68–72, 79, 80, 130, 134, 139, 144, 151, 159, 162, 164–166, 172, 231, 281
 - recovery after photobleaching (FRAP)..... 36, 52, 57, 66, 71
 - resonance energy transfer (FRET) 6, 35, 52, 57, 66, 72, 73, 139, 144–147, 169, 289–294, 357
 - in situ hybridization (FISH)..... 125, 133, 144, 164
 - slides 169, 319, 322, 323, 326, 336, 337, 339, 344, 348, 350, 351, 355, 359, 361, 363, 368, 372
- Fluorescence lifetime imaging (FLIM) 35, 36, 167, 287–291, 294
- Fluorescence recovery after photobleaching (FRAP)..... 36, 52, 57, 66, 71
- Fluorescence resonance energy transfer (FRET)..... 6, 35, 52, 57, 66, 72, 73, 139, 144–147, 169–171, 289–294, 357
- Fluorescent lectin 162, 163
- Focal adhesions..... 34
- Focal plane..... 16, 17, 19, 20, 33, 37, 43, 50, 62, 83, 162, 213, 234, 237, 238, 244, 266, 267, 271, 274, 284, 335
- Focus 4, 5, 9, 11, 12, 14, 17, 19, 27, 37, 38, 83, 155, 156, 164, 167, 169, 182, 253, 273, 274, 314, 322, 326, 352
- Formaldehyde 152, 157, 159, 178, 179, 189, 191, 192, 194, 195, 197, 198, 203, 204, 259, 262, 264, 269, 308, 324
- FRAP. *See* Fluorescence recovery after photobleaching (FRAP)
- Freeze cracking..... 261, 262, 268
- FRET. *See* Fluorescence resonance energy transfer (FRET)
- G**
- Galvanometer 14, 17, 23, 59, 60, 322, 325, 330–332, 356–358, 366
- Gamma..... 59, 105, 115, 116, 125, 127
- Gaussian 62, 220
- Gene expression..... 30, 177, 178
- Germ cells 257–271
- Glioblastoma 150–153, 159, 161, 162, 172
- Grayscale 19, 26, 40–42, 77, 79, 80, 98–100, 103–110, 112, 114, 115, 119, 120, 126, 127, 158, 280
- Green fluorescent protein (GFP) 18, 20, 30, 32, 36, 70, 145, 155, 165, 192, 193, 202, 208, 231, 243–246, 251, 254, 267, 271, 306, 307, 310–312, 314
- H**
- Heart
- adult..... 187, 188, 196–198
 - embryonic..... 188, 190, 194, 197, 198
- Hoechst 33342 141, 153, 154, 160, 164, 230, 232
- HrLuc-RFP-TK..... 151, 152, 161, 162
- Hypertext markup language (HTML)..... 52, 53, 73–77, 81, 82, 84
- I**
- Illumination..... 1, 3–5, 10, 15, 23, 32, 36–39, 53, 59, 63, 65–67, 69, 84, 155, 164, 170, 215, 216, 234, 238, 275, 321–323, 326, 327, 337, 340, 349–353, 357, 362, 371
- Image
- informatics..... 43–44
 - J 206, 207, 219, 278, 280, 285, 299, 325, 344
 - mode..... 103, 106, 107, 109, 110, 119
 - presentation 27, 42
 - processing 14, 42, 51, 53, 56, 77, 79, 80, 82, 100, 103, 135, 216, 219–222, 279, 306, 313–318
 - registration..... 24, 34, 357
 - stacks 32, 37, 57, 60, 124–126, 206, 351
- Immunofluorescence 2, 24, 49, 151–153, 157–158, 161, 162, 164, 178, 179, 181, 183, 260, 268, 269, 315
- Incubator 30, 229, 230, 232, 233, 236, 237, 239, 309, 312
- Informatics 43–44, 89
- Injection 151–153, 245, 247, 250, 251, 253, 254
- Integrated microscopy 34
- Intensity 23, 28, 29, 35, 50, 52, 55, 58–62, 67, 68, 71, 83, 84, 97–99, 107, 118, 119, 137, 140, 143, 146, 154, 167, 196, 197, 207, 219–222, 224, 233–235, 237, 238, 274–276, 279–290, 292, 294, 314, 320–322, 324, 326–330, 332, 334, 337–341, 344–346, 349–353, 355, 356, 358–361, 367–369, 371, 372
- Internet..... 49–89
- K**
- Karyotyping..... 130, 133, 136, 141, 144
- Keynote 43
- Kidney 79, 80, 152, 160, 305–320
- Krypton argon laser 25, 189, 231, 239, 269, 270, 286, 323, 334–337, 340, 348, 349, 352, 354, 356, 358, 359, 368–370, 373

L

Larva180, 181, 183, 201–210

Laser

- argon.....25, 58, 131, 154, 160, 189, 231, 269, 270, 286, 323, 358
- diode..... 61, 62, 288, 349
- helium-cadmium (He-Cd)..... 54, 61
- He-Ne54, 61, 62, 168, 223, 358
- infrared37
- Krypton-Argon (Kr-Ar)..... 25, 54, 61, 154, 231, 239, 269, 270, 286, 323, 334–337, 340, 348, 349, 352, 354, 356, 358, 359, 368–370, 373
- power 18, 30, 62, 66, 71, 154, 160, 168, 169, 207, 208, 269, 283, 299, 321, 322, 326, 328, 333, 335–340, 344, 345, 348, 349, 351, 353–356, 358–362, 366–373
- sanning confocal microscope 2–4, 9–44, 49, 50, 57–60, 71, 83, 218, 223, 321–323, 325–328, 333, 335, 340, 348–350, 353, 355, 356, 358–361, 365, 366, 368–371, 373

Length measurement.....28

Levels 4, 11, 15, 18, 24, 27, 30, 35, 40, 55, 58, 59, 62, 63, 66–68, 70, 71, 78, 79, 84, 86, 87, 89, 99, 102, 104, 106–112, 114, 115, 118, 119, 122, 125, 127, 130, 132, 159, 178, 181, 183, 227, 238, 275–277, 280, 281, 283, 285–287, 289, 301, 311, 314–316, 321, 328, 331, 332, 344, 345, 366, 368, 370, 371

Lifetime imaging..... 57, 61, 289

Linear unmixing..... 129–147

Live cell imaging17, 30–32, 36, 57, 63, 69, 70, 79, 80, 89, 147, 270–271

Living tissue 7, 9, 13, 30, 32, 37, 288

Lookup table (LUT) 40, 59, 99–100, 156, 158, 162

Low magnification20, 22, 149–172, 299

Lung.....297–303

M

Magnetic resonance imaging (MRI)39, 151

Magnification..... 9, 10, 18–22, 69, 79, 149–172, 199, 206–208, 233, 234, 274, 299, 326–328, 331, 334, 335, 347, 350, 352, 357, 362, 366, 372

Maximum intensity projection (MIP), 220–222, 310, 320

Measurement.....6, 28, 35–36, 62, 66, 97, 104, 105, 124, 139, 157, 198, 216, 237, 273–294, 299, 302, 306, 317–322, 324–328, 336–338, 344, 348, 349, 351, 353–356, 358, 359, 361, 367, 368

Median 111, 112, 220, 327

Medium.....21, 39, 152, 154, 156, 157, 203, 205, 214–216, 218, 229–232, 239, 249, 259, 263, 265, 270, 276, 277, 280, 306–310, 312, 318, 323, 333, 364

Membrane57, 161, 178, 180, 189, 194, 202, 205, 206, 209, 229, 230, 236, 239, 253, 260, 280, 281, 308–310, 312, 319

Mesolens22

Metadata 44, 87

Metanephros305, 306, 310–312, 317

Microinjection..... 30, 249

Microspheres298

Microtubules 2, 3, 5, 17, 34, 254, 255, 257–271

Midtone..... 116, 117

MIP. *See* Maximum intensity projection (MIP)

Misregistration115

Mitochondria 24, 71, 161, 229, 230, 239, 361

Mitosis.....263, 266

Mixer..... 106, 107

Monitor.....4, 15, 35, 40, 51, 60, 70, 74, 98–100, 102, 104, 107, 158, 224, 254, 331, 357

Monoclonal antibody 150, 157, 258, 262

Mountant 32, 218, 276, 277

Mounting medium 189–190, 195, 196, 203, 205, 214, 215, 218, 219, 259, 263, 265, 270, 308, 310, 323, 324

Mouse..... 22, 26, 56, 65, 69, 104, 149, 151–153, 155, 156, 158–163, 165, 172, 181, 187, 188, 190, 194, 204, 228, 231, 305–320

mRFP1 151, 164

MRI. *See* Magnetic resonance imaging (MRI)

Multicellular spheroid227–240

Multicolor imaging.....129

Multidimensional imaging32, 33

Multiphoton..... 37, 38, 57, 149, 153, 163–167, 288

Multiple wavelength imaging23, 24, 26, 32, 33

N

Nanometer..... 39, 72, 294

Nervous system.....22

Neuroblastoma 152, 153

Neuromuscular junction 201–210, 293

Nipkow disc.....14

Noise4, 11, 14, 16, 23, 36, 56, 58, 63, 100–112, 120, 121, 125, 142–144, 157, 219, 220, 238, 284, 290, 291, 321, 325, 336, 337, 339–341, 344, 345, 353–355, 358, 359, 362, 363, 365–372

Nuclei..... 10, 24, 26, 153, 160, 164, 170, 210, 230, 237, 244, 251, 253, 260, 263

Numerical aperture (NA)14, 20–22, 27, 32, 56, 65, 68, 154–157, 171, 193, 210, 215, 219, 270, 275–277, 310, 319, 324, 326–331, 333, 341, 344, 345, 348, 352–356, 363, 371–373

O

Objective lens 10–13, 16, 18–22, 24, 27, 28, 30, 34, 37, 149, 155, 156, 159, 169, 171, 181, 182, 210, 215, 216, 219, 223, 233, 237, 270, 274, 348

Oil immersion 27, 80, 215, 237, 275, 277, 278, 294, 323–325, 351

Open Microscopy Environment (OME) 43, 44, 89

Optical microscope.....11, 53, 56, 60, 69, 89

projection tomography (OPT)39
 section..... 5, 10, 11, 17, 20–23, 25, 27, 28,
 30, 32, 36–40, 43, 60, 77, 85, 141, 155, 187, 188, 193,
 194, 199, 202, 206–208, 210, 214, 215, 233–235,
 238, 255, 267, 279, 280, 310–313, 316, 319
 zoom..... 10, 207, 208
 Output..... 12, 15, 16, 20, 28, 61, 62, 66, 77, 98, 101,
 103, 107–115, 118–120, 124, 127, 128, 168, 169,
 270, 279, 286, 302, 328, 349, 353–355, 359, 362
 Overlap..... 23, 41, 59, 64–66, 68, 73, 107, 131, 133, 134,
 142–144, 182, 183, 193, 207, 260, 287, 289, 292, 294

P

Palette..... 70, 78, 83, 104–106, 111, 114, 130
 Paraformaldehyde..... 152, 157, 159, 189, 191, 192,
 194, 195, 197, 198, 203, 259, 262, 264, 269, 308, 324
 Patent2
 Penetration 37, 39, 51, 163, 164, 195,
 196, 209, 214, 215, 228, 233–235, 237
 Perfusion..... 149, 152, 159, 161, 164,
 165, 297, 298, 300, 301
 Permeabilize189, 191, 194, 209, 260
 Phalloidin186–189, 192, 196, 208, 210
 Photoactivation36, 39, 52, 61, 71
 Photomultiplier 11, 12, 15, 16, 51, 56, 58,
 62–64, 66, 78, 83, 275
 Photon.....6, 18, 30, 32, 35,
 37, 62, 63., 64, 130, 131, 142, 154, 156, 160, 165,
 214, 287–290, 322, 370
 Photon efficiency.....30
 Photoshop 26, 28, 40–43,
 76, 80, 97–128, 151, 158, 178, 182–183, 203, 207
 Phototoxicity 32, 39
 Pinhole 2, 5, 11–13,
 16–21, 37, 50, 62, 65, 83, 84, 126, 141, 155, 160, 170,
 210, 213, 224, 255, 273, 274, 315, 322, 328, 330, 335,
 341, 343, 344, 348, 352, 353, 366–368, 370
 Pixel..... 18, 23, 28, 44, 57, 63–66,
 77–81, 84, 99, 100, 104–106, 108, 112, 117, 120, 136,
 143, 156, 172, 182, 193, 196, 197, 220, 221, 224, 238,
 279, 280, 284, 288, 299, 310, 311, 313–319, 325,
 330–331, 344–348, 356–357, 364, 366–369, 372
 Plan-*apo*155, 171, 237, 270,
 324, 326, 327, 329, 331, 333, 334, 341, 344, 345, 348,
 352, 355, 356, 363, 372, 373
 Platelet derived growth factor.....196
 Polarization.....6, 338–340, 354, 355, 358–360
 Polarized light 34, 55, 56
 Pollen grain..... 24, 213, 277
 Power meter..... 168, 283, 323–324, 326–328, 340, 348,
 353–356, 361, 373
 Powerpoint43, 73, 77, 98, 128
 Profile 29, 30, 38, 53, 58–60, 62, 66–70,
 72, 73, 100, 102, 131, 143, 145, 275, 278–280, 330
 Pupa181

Q

Quantitative..... 6, 35, 44, 60, 64, 66, 130,
 144, 145, 157, 165, 166, 288, 301, 306
 Quantization108
 Quantum dots 18, 153, 161
 Quicktime 42, 43, 87, 88

R

RAID. *See* Redundant array based server (RAID)
 Rasterization.....104
 Ratio imaging283–286
 Ratiometry.....285
 Ray tracing 222, 224
 Red green blue image (RGB)26, 41, 42, 101–107,
 109–112, 114, 118, 119, 156, 159, 170, 221, 319
 Redundant array based server (RAID)43
 References44, 53, 57, 89, 136, 137, 139, 140,
 142, 143, 194, 328, 346, 349, 353, 354, 361–362, 368
 Reflected light imaging32–34
 Refractive index..... 37, 214–216, 276–278, 280, 281, 324
 Registration24, 34, 321, 322, 324,
 330–336, 350, 357–358, 371
 Rendering..... 50, 57, 65, 214, 216, 220–224
 Renilla luciferase..... 151, 164
 Reporter probes 27, 30, 35
 Resolution 2, 5, 9, 10, 12, 14, 15, 17,
 18, 20–23, 28, 32, 34, 35, 37, 39, 40, 49, 56, 65, 68,
 72, 77, 81, 98, 113, 140, 141, 155, 156, 167, 178, 181,
 182, 185, 201, 202, 215, 220, 224, 227, 238, 243,
 275–277, 279, 280, 288–290, 294, 298, 299, 310,
 319, 321, 322, 325, 328–330, 333–335, 343, 347,
 350, 353, 356, 357, 361–367, 371
 Resonant energy transfer287–294
 RGB. *See* Red green blue image (RGB)
 Rhodamine 20, 25, 41, 188, 244, 248, 249,
 251, 253, 254, 255, 270, 285, 289, 298–300, 351

S

Sampling105, 106, 114, 115, 118,
 119, 222, 310, 319, 325, 331, 367
 Sanguinarine..... 231, 234, 237, 239
 Sarcomere.....186
 Saturation 4, 5, 15, 99, 108, 118,
 119, 127, 165, 275, 283, 285, 328, 330, 355
 Saving files..... 112, 126–127
 Scan head19, 32, 34, 154, 168–171, 349, 360, 364
 Scanned light sheet microscopy37–39
 Scanning mirror..... 15, 17, 19, 51, 60, 343
 Second harmonic generation (SHG).....37
 Segmentation..... 280, 313, 315
 Sensitivity.....6, 12, 15, 23, 32, 62, 63, 72, 147,
 168, 243, 321, 344–351, 362, 363, 368–371, 373
 Sharpness..... 3, 119–121
 Signal averaging.....32

Slide..... 39, 55, 108, 140, 153, 181,
191, 203, 218, 246, 258, 274, 308, 321

Software 14, 15, 17, 18, 20, 28,
35, 40, 43, 50–52, 57–59, 68, 72–77, 80–89, 98–100,
107, 108, 111, 124–128, 140, 142, 146, 150, 157, 158,
160, 165, 166, 178, 183, 196, 206, 210, 214, 219, 220,
222, 224, 235, 238, 251, 278–282, 285, 286, 292, 294,
298, 325, 344, 346

Spacer..... 215, 217, 219, 223

Spatial filter..... 1, 19

Spectral
 imaging..... 23, 24, 59, 67, 89, 129–147, 363
 unmixing..... 147, 165

Sperm 258, 265–266, 270, 365, 371

Spheroid..... 227–240

Spinning disk..... 5, 6, 14, 15, 38, 61, 266, 267, 270

Spot scanning..... 5, 170

Square pixel 330–331, 356–357

Stage..... 5, 12, 14, 17, 18, 22, 25, 29, 30, 43, 51, 69,
159, 162, 167, 180, 183, 202, 208, 210, 229, 234, 237,
244, 248–253, 267, 274, 299, 319, 322, 323, 326, 328,
336–338, 340, 341, 343, 348, 349, 353–356, 358,
364, 367–370, 373

Statistical analysis..... 297–300, 302, 303

Stepper motor..... 19, 27, 28, 37

Stereo anaglyph 41

Stereology..... 281, 282

Stimulation emission depletion microscopy
 (STED) 39, 166

Stochastic optical reconstruction microscopy
 (STORM) 39

Stokes' shift 130, 131

Stress fibers..... 24

Structured illumination 36–37, 39

Super resolution..... 39

Surface area 280–282, 297

System performance 154, 321–373

T

Tagged image file format (TIFF) 78, 113, 115, 123–126,
128, 158, 255

Tandem-scanning microscope (TSM)..... 14

Testicular hyaluronidase 190, 194

Test slides 321, 323–325, 351, 355, 361–362

Tetramethylrhodamine methyl ester (TMRM)..... 229, 230,
232–236, 239

Thickness measurement 276–280

Thick specimen 37, 60, 214, 215

Three-dimensional
 imaging..... 27–28, 33, 40, 59, 125, 185
 structured illumination 39

Thresholding 281, 313

TIFF files. *See* Tagged image file format (TIFF)

Time-lapse 28, 30, 31, 40–43, 57, 59, 70,
71, 80, 85, 144, 229, 234, 237, 238, 271, 311

Tissue extrusion..... 264–265

TMRM. *See* Tetramethylrhodamine methyl ester (TMRM)

Tomato lectin 149, 150, 152–153,
158–161, 163, 164, 166, 168, 172

Total internal reflection fluorescence (TIRF)..... 38, 39,
57, 61

TOTO3..... 20, 259, 260, 263,
265, 270

Transmitted
 light detector 34, 358
 light imaging 34, 159

Triple label..... 25, 40–42, 67, 187, 234

Troubleshooting 103–104, 283

Tubulin244–246, 248, 249, 251, 253, 254, 255, 257, 258, 267

Tumor..... 149–172, 227, 228

U

Unsharp mask..... 119, 120

Ureteric tree..... 305–320

UV light 36, 338, 350, 357

V

Vector 57, 80, 81, 84, 104, 150–152, 157, 162,
166, 179, 192, 203, 208, 231, 235, 240, 259, 270, 324

Vector file 104

Vibratome..... 159, 187, 190, 195–199

Video 4, 15, 19, 34, 40, 43, 50, 51,
57, 69, 72, 73, 77, 81, 84–89

Vital imaging..... 227–240

Volume
 measurement..... 280–282
 rendering 50, 57, 220–222
 visualization..... 28, 214–217, 219–222

W

Wavelength..... 13, 50, 130, 154, 210, 233, 270, 283, 323

Web resources..... 44, 54, 57, 89

Website..... 52–57, 61, 65, 66, 68, 74, 76, 77, 84, 89

Whole animal methods 40

Widefield..... 50, 53–70, 72, 77, 78, 83, 85,
139, 141, 146, 170, 282, 284–286, 288

Wing disc 179–181, 183

Working distance..... 21, 69, 155, 215, 219, 277, 371

World wide web 50, 89

X

Xenogen 3D IVIS® 151

Xenograft..... 152

X-Y resolution 155

X-Z imaging..... 28–30

Y

Yellow fluorescent protein (YFP) 18, 35, 134,
138, 145, 146, 166, 169–171

Z

Z-
resolution 155, 322, 325, 328–330, 356, 363

series 19, 27, 28, 30, 32, 33, 40,
41, 156, 159–162, 165, 193, 194, 196, 197, 206, 235,
266, 267, 311, 313
step 28, 156, 160, 196, 197, 207, 208, 319
Zirconium 11–13