### Index

<table>
<thead>
<tr>
<th>Page Numbers</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>275</td>
<td>275</td>
</tr>
</tbody>
</table>

**A**
- Ablatherm® device, 110, 127, 134, 135, 138, 141, 142
- ACE Harmonic™ scalpel, 12, 13
- AcuBot®, 52, 53, 254
- Acute renal injury, 192–194
- Advanced Life Support™, 259
- Advance Trauma and Life Support™, 259
- AESOP™. See Automated endoscopic system for optimal positioning
- AirSeal, 200
- American Society for Therapeutic Radiology and Oncology (ASTRO) criteria, 111, 112, 138, 141, 143
- Anderson–Hynes dismembered pyeloplasty, 23
- Anterior dissection, 12–13
- ArthroARM™, 55
- ASTRO Phoenix criteria, 138
- Augmented reality (AR) for image-guided surgery in urology, 215–221
- Aura XP™ laser, 86, 87
- Automated endoscopic system for optimal positioning (AESOP™), 52, 253–255

**B**
- Battlegroup Telemedicine System (BGTM), 255
- Benign prostatic enlargement (BPE) treatment, 59–64
- Benign prostatic hyperplasia (BPH), HIFU treatment, 137
- Bioartificial kidneys, 148
- Biochemical recurrence free survival (BRFS), 5, 97–99
- Bladder, 8, 12, 22, 39, 44, 49, 59, 68, 71, 83, 94, 109, 126, 135, 147, 165, 175, 190, 206, 209, 225, 246, 265
- Bladder augmentation and substitution, 149
- Bladder biopsy, 74, 149, 170
- Body mass index (BMI), 5, 13, 15, 16, 193, 205
- Bosniak system, 244
- Brachytherapy (BXT), 52, 93, 96–100, 108, 111, 112, 141, 142, 227, 229, 244
- Bristol TURP Trainer™, 265
- Color-coded surgical navigation system, 221
- Color Doppler imaging (CDI), 20, 110, 143, 228
- Complementary metal semi-conductor (CMOS), VLSI design, 53, 271
- Computer equipped with a coder/decoder (CODEC), 252, 254
- Computer tomography (CT) angiogram, 19
- urography, 225, 226
- Confocal fluorescent microscopy (CFM), 180–182
- Connecticut Tumor Registry, 105
- Contrast-enhanced Doppler ultrasound (CEDUS), 108
- Contrast enhanced MRI, 138, 141, 228–229
- Contrast-enhanced ultrasonography (CE-US). See Ultrasonography (US)
- Conventional MRI vs. 3T MRI, 229–230
- Cross-sectional imaging, 179, 226, 227, 272, 273
- Cryoablation, 98, 100, 109, 110, 130, 155, 203, 224, 242, 244–246
- Cryobiology, 108
- Cryocare™, 94
- Cryochemotherapy, 101
- Cryo-immunotherapy, 101
- Cryosurgery, 93–94, 97, 133, 141–143
- Cryosurgical ablation, for prostate cancer, 93–101
- Cryotherapy techniques, 52, 93–101, 108–110, 115, 118, 127, 141, 144, 155, 203, 225, 229, 231
- CT/MRI scanners, 20, 49
- CT/PET, 230, 231
- Curtain dissection technique, 177
- Cyberknife, 111, 156–158
- Cystoscopy, 21, 22, 25, 40, 71, 77, 97, 109, 170, 226, 247, 255, 265
- Da Vinci surgical (DaVinci-S) robotic system, 3–4, 32, 43, 49, 177, 205
- 3D CT scanning, 187–188, 194
- Definity®, 238
- Delayed morbidity, 61
- Diffusion imaging, 229, 230
- Diffusion tensor imaging (DTI), 182
- Diode lasers, 83, 188
- 3-Dmed laparoscopic trainer™, 262
- 3D visualization, 4, 54, 215, 237
- Dye lasers, 68, 69
- Elastography, 51, 228–230, 237, 239, 240
- Emerging robotics, 49–55
- EndoEye, 201
- Endoloop™, 13
- Endopath “ATW45 linear stapler, 12
- Endopyelotomy, 20, 24, 25, 69, 246
- Endoscopic/endoluminal US (EUS), 211, 237, 246
- Endoscopic retrograde cholangiopancreatography (ERCP), 209

---

**E**
- Echography, 51, 228–230, 237, 239, 240
- Emerging robotics, 49–55
- EndoEye, 201
- Endoloop™, 13
- Endopath “ATW45 linear stapler, 12
- Endopyelotomy, 20, 24, 25, 69, 246
- Endoscopic/endoluminal US (EUS), 211, 237, 246
- Endoscopic retrograde cholangiopancreatography (ERCP), 209
Endostat™ end-firing fiber, 86
E-Notes, 210
Enseal™ device, 273
ERBE™ Jet2 generator, 161–163
External beam radiation therapy (XRT), 105, 141, 155, 156, 158
External beam radiotherapy (EBRT) contemporary, 96
Extra-corporeal stone fragmentation techniques, 67

F
Fengerplasty, 23
Fetal cells, 147
Flexible endoscopy, 54, 197, 205, 215, 237
fMRI. See Functional MRI
Focal brachytherapy, 108
Focal nerve sparing cryotherapy, 100
Focal therapy, 105–112, 142–144
Force sensing, 49–51
FREDDY laser, 68
Freeze-thaw cycle, 95–96
Functional MRI (fMRI), 182, 215

G
Gas lasers, 68
GastroARM™, 55
GelPort, 199, 200, 203
Gene/laser therapy combination, 77
Greenlight® HPS system, 81, 83
Greenlight® KTP laser, 85
Greenlight® PV system, 83

H
Habib®4X bipolar resection device, 85
Harmonic motion imaging (HMI), 51
Harmonic US. See Ultrasonography (US)
Heine-Mikulicz, 23
Hemodialysis, 148
Hem-o-loks, 12
Hemostatic hydrodissection of the neurovascular bundles (HYNEB), 162–163
HERMES, 253
High intensity focal ultrasound (HIFU)
  biology, 110
devices, 110, 127
  as focal therapy, 110
  in the kidney, 127–128
  in the prostate, 111, 133–144
  technique, 110, 126
Histology, 62, 75–77, 82, 85, 124, 142, 158
Holmium enucleation of the prostate (HoLEP)
  durability, 59, 62–63
  procedure, 59–63
Holmium laser, 59–64, 68–70, 73, 77, 81
  physics of, 59
Holmium laser ablation of the prostate (HoLAP), 64
Holmium laser bladder neck incision (HoBNI), 63–64
Holmium laser resection of the prostate (HoLRP), 59, 63, 64
Holmium laser to resect bladder tumours (HoLRBT), 75, 76
Holmium:YAG laser (Ho:YAG), 68, 73, 75–77, 80–83, 188
Hospital stay, 4, 11, 15, 16, 19, 43, 44, 49, 59, 61, 62, 64, 87, 155, 204
Human embryonic stem cells, 147
Hybrid-NOTES. See NOTES
Hydrodissection principle, 161–162
Hydro-jet technology, 161–164

I
IceRod™17-gauge cryoneedle, 109
Image-guided surgery in urology, initiation, 215–221
Imaging, advances in, 223–231
Immersive telerobotic environment, 4
Injectable therapies, 152
International Robotic-Assisted Cystectomy Consortium (IRCC), 15
Interstitial laser thermoablation, 108
Interstitial laser thermoablation, focal, 111
Intra-corporeal stone fragmentation techniques, 67
Intra-operative laparoscopic ultrasound (ILUS), 118, 190, 194, 204
Intraoperative transrectal ultrasound, 178–179
Intravenous urography (IVU), 19, 20, 25, 171, 224, 225
Intubated ureterotomy, 20
In vitro expansion of cell lines, 152
IPSS, 61, 63, 64, 143

J
Joule-Thompson effect, 94

K
Knowledge-based behavior (KBB), 259, 260
KTP laser, 62, 64, 81, 83–87, 188–190, 194
KTP:YAG, 73

L
LaparoARM™, 55
Laparoendoscopic single site (LESS) nephrectomy, 203
  procedures, 197, 198, 200, 201, 205
  therapy, 209, 213
  history, 197–198
  new advances, 197–206
  techniques, 86, 203, 205, 206
Laparoscopic pyeloplasty, 19, 20, 81–82, 87, 247
Laparoscopic radical cystectomy (LRC), 11, 14, 16, 17, 221
Laparoscopic radical prostatectomy (LRP), 3–9, 27, 41, 49, 85, 87, 162–163, 217, 237, 262, 273
Laparoscopic ureterocystoplasty, 166, 167, 169, 170
LapMentor™, 263
LapSIM™, 263
Laser ablation, 64, 69, 73–75
Laser-assisted cryotherapy (LAC), 100
Laser beams, 79
Laser laparoscopic radical prostatectomy (LRP), 4, 5, 7, 9, 85–87, 177, 216, 217, 221
Laser physics, 79–81
Lasers
  for bladder tumors, 71–77
  in bladder tumors treatment, 71–77
  classification, 67–68
  in laparoscopic surgery, 79–88
  and pregnancy, 70
  for prostate surgery, 69
  safety procedures, 70
  for stone management, 68–69
  for stricture and PUJ obstruction, 69
  for transitional cell carcinoma, 69
  in urology, 68–70
Lasix renal scan, 19, 20
Lateral dissection, 12
Learning curve, 4, 5, 8, 33, 37, 41, 45, 63, 69, 75, 138, 198, 205, 211, 215, 238, 251, 253, 259, 262, 264, 265
LeGoo™, 192
LESS. See Laparoendoscopic single site
Leydig cells, 151
Ligasure® devices, 85
Lower urinary tract symptoms (LUTS), 59, 99, 100, 137, 247
Lymphadenectomy, 13, 14, 16, 209

M
Magnetic anchoring and guidance system (MAGS), 201, 205
Magnetic resonance elastography (MRE), 51
Magnetic resonance imaging (MRI)
guided biopsy, 230
Magnetic resonance spectroscopic imaging (MRSI), 229, 230
Magnetic resonance urography (MRU), 226
Master-slave systems, 3
MEMS microgripper, 50
Microsoft Plus Plus, 253
Minimally invasive laparoscopic prostatectomy, evolution of, 4
MIST VR™, 260, 261, 263
Monocrystalline iron oxide nanoparticles (MIONs), 273
Moore’s law, 49
Motorized endoscopic grasper, 50
MRI/CT augmented intra-operative navigation, 230
Multitemp™ 1601 temperature monitoring system (TMS), 109

N
Nanomedicine, 269
Nanorobot hardware architecture
power supply, 270
technical aspects, 269–272
teleoperation and actuation, 270
urological applications, 272–274
Nanorobots, 53, 54, 269, 271–274
Nanorobot surgical applications, 272
Nanotechnology
biocompatibility, 271
communication, 270
miniaturization, 269–270
nanobiosensors, 271
nanoelectronics manufacturing, 270
National Cancer Research Network (UK), HIFU trials, 143
Natural orifice transluminal endoscopic surgery (NOTES)
benefits of, 212
challenges of, 212–213
EUS-guided, 211
history, 209
hybrid, 210–211
single-port, 210
techniques, 209–212
training, 211
transanal, 210
transesophageal, 210
transgastric, 209–210
transmuscular, 210
transvaginal, 210
and urology, 211–212
NDO Plicator, 212
Near infrared fluorescence (NIRF) intra-operative imaging system, 182
Neodymium:YAG lasers (Nd:YAG laser), 59, 68, 72–74, 81, 82, 84, 86, 87
Nephron-sparing surgery (NSS), 115, 127, 187, 188, 190, 223, 226
Network enhanced surgical training (NEST), 256
Neuropack nerve stimulator, 180
Neurovascular bundle (NVB)
history, 175
intra-operative mapping of, 177–178
preservation, 177
during prostatectomy, 175–182
revisiting the anatomy of, 176–177
Niris OCT system, 179
Nissen’s fundoplications, 43, 256
NOTES™, 54
Novalis System, 156

O
Open partial nephrectomy (OPN), 27, 82, 115, 117, 192
Open radical cystectomy (ORC), 11, 15–17
Operating times, 15, 43, 44, 59, 62, 64, 75, 83, 203, 204, 215
Optical coherence tomography (OCT), 179–182, 190
Optical reflectance spectroscopy (ORS), 190
Optislot™, 238
Ovary, 152, 167

P
Paediatric robotics advantages and limitations, 45
Paediatric surgeons, 43–44
Penis, 150, 178, 182
Percutaneous access to the kidney robot (PAKY), 52, 253–255
Percutaneous nephrolithotomy (PCNL), 52, 224, 225, 255, 265–266
Percutaneous Nephrolithotomy Trainer™, 265
Percutaneous robotic biopsy, 52
PERCX Mentor™, 265
Perioperative morbidity, 4, 59, 61, 62
Periprostatic anatomy, 4, 175, 216
Photodynamic therapy, 108, 110–111, 133, 142
Pneumatic stepper motor (PneuStep), 52
Polaris system, 217–220
Positron emission spectroscopy (PET), 215, 224, 230, 231
Posterior dissection, 9, 12
Post-operative care, 14, 64, 187
Potassium titanyl phosphate (KTP) laser, 68, 73, 168
Power Doppler (PD) imaging, 108
Pre-euthanasia intravenous urography (IVU), 171
Pre-operative-image to real-time-image algorithm, 221
Primary cryotherapy
patient selection, 96
of the prostate complications, 99
Programmable Universal Manipulation Arm (PUMA), 3
ProMIS™, 262, 263
Prostate cryotherapy, physical parameters, 95–96
Prostate focal therapy
definitions, 105
indications, 105–106
Prostate HistoScanning™, 244
PSA reduction, 62
Pyelolysis, 20

Q
QuadPort, 200

R
Radiofrequency ablation (RFA), 52, 115–121, 125, 127, 133, 142, 155, 163, 224, 225, 227, 244, 246
Radiographic diagnosis, 187, 194
Radiosurgery, 108, 111, 155–158
Radiosurgical technologies, 155–158
Radiotherapy, 74, 96–101, 111, 112, 133, 138, 142
RALP HYNEB cases, 162
RealHand HD series, 201
Real-time virtual sonography, 246
Reconstructive surgery, 147, 150, 165, 171
Rectal wall protection, 100–101
Remote centre of motion (RCM), 52, 255
Renal failure, 148
Renal radiosurgery, 155–158
Renal transplantation, 148
Rendezvous technique, 211
Renorrhaphy, 31–33, 187, 190–191
Retroperitoneal lymph node dissection, 161
Revolving needle driver (RND), 53
Robotic assisted laparoscopic partial nephrectomy
anesthetic considerations, 28
application of the Satinsky clamp, 32
colic mobilization, 30–31
complications, 34–35
cystoscopic ureteral catheter insertion, 28–30
defatting of the kidney, 32
docking of the robotic cart, 32
indications for, 27–28
intra-operative ultrasonography, 32
mobilization of the kidney, 31
parenchymal suture placement, 33–34
patient preparation, 28
preparation of the hilum for en bloc clamping, 31–32
procedure, 28–34
prophylaxis, 28
room set-up, 28
tumor excision, 32–33
Robotic(ally) assisted laparoscopic radical prostatectomy (RAL(R)P)
functional outcomes, erectile dysfunction, 7
functional outcomes, urinary incontinence, 7–8
indications for, 4–5
intra-operative outcomes, 5
and the learning curve, 5
oncological outcomes, 5–7
post-operative complications, 5
Robotic assisted radical cystectomy (RARC)
comparison of ORC and, 15
comparison of ORC, LRC and, 16
ergonomics, 16–17
oncological outcomes, 16
outcomes, 14–15
quality of life and patient satisfaction, 16
Robotic assisted surgery in children, principles, 43–47
Robotic Natural orifice transluminal endoscopic surgery (R-NOTES), 211
Robot needle placement, 52–53
Robotic pyeloplasty
pre-operative evaluation and management, 20–21
room set-up, 21–22
surgical approach, 21
surgical site, 22
trocar placement, 22
Robotic retroperitoneal pyeloplasty, 44
Robotics, history of, 3
Roticulator series, 201
Rule-based behavior (RBB), 259, 260
Salvage cryotherapy
oncological results, 99
patient selection, 96–97
series, complications, 99–100
Scarless surgery, 55, 209, 213
Scintigraphy, 20, 21, 215, 273
Scope Trainer™, 265
Seednet™, 94
Self-approximating transluminal access technique (STAT), 210
Sexual function, 41, 62, 150
SHIM, 7, 87, 163
Simulators
assessment of, 261
for laparoscopic surgery, 262
TURP, 264–265
types of
box trainer, 262
hybrid trainer, 262–263
for urology training, 261–262
virtual reality (VR), 263–264
Single-incision laparoscopic surgery (SILS), 200, 210
Single-incision laparoscopic surgery (SILS) access, 200
Single port access (SPA), 192, 200, 203, 205
Single port access renal cryoablation (SPARC), 203
Single-port NOTES, See NOTES
Skill-based behavior (SBB), 259, 260
Small renal mass, 82, 115, 117, 121, 123–130, 163, 244
Smart Needle measurement of biopendence, 190
Socrates, 253
Sonablate® 500 device, 127, 135, 138, 143, 144
Sonoelastography, 51, 228
Sonosurg® devices, 85
SonoVue®, 238
Spatial compound imaging, 235–237
Spina bifida, 147, 148
Stereotactic radiosurgery, 156
Survideo Sbus card, 217
SurgASSIST, 212
Surgical robotic science, future of, 156
Surgical SIM LTS™, 262
Surveillance, Epidemiology and End Results (SEER), 4
Synchrony, 156
T
Telemedicine centers, 256
Telemororing
future, 256–257
history, 251–252
ISDN connections, 252, 253
limitations, 255–256
space applications, 255
Telerobotics, 43–44, 252
Telerobotic surgery, 43, 47, 52, 254
Telescopes, 45, 46, 60, 67, 201
Template saturation biopsy (TSB) protocol, 107
Testes, 150–151, 231
Thulium laser, 73, 77, 80, 81, 85, 188–190
Thulium:YAG laser, 73
Tissue bioengineering, 147–153
Tissue expansion
physiology, 165–166
in urinary tract, 166–171
Tissue identification, 49–51
Tomotherapy, 156
Tookad, 111, 144
Transperitoneal pyeloplasty, 44
Transrectal ultrasound guided cryotherapy, 94
Transumbilical endoscopic surgery (TUES), 210
Transurethral resection of bladder tumor (TURBT), 71, 74–77
Transurethral resection of the prostate (TURP), 3–5, 59, 61–64, 69, 135, 137, 142, 143, 264–265
TriPort, 199–201, 203–205
TRUS probe, 217–219
TURP simulators. See Simulators

U
Ultrasonography (US)
  contrast-enhanced, 238
diagnostic, 235–247
harmonic, 236
technical advances, 235–239
therapeutic, 235–247
Uni-X single port access laparoscopic system, 200
Ureteropelvic junction (UPJ)
  exposure of, 22–23
  obstruction, 19, 20, 22, 25, 26
Ureters, 12, 13, 20, 22, 23, 31, 32, 69, 70, 116, 128, 147, 149, 152,
  166–172, 176, 203–205, 210, 225, 226, 246–247, 265
Urethra, 13, 97, 100, 109, 147, 149–150, 168, 175, 176, 265
Uretral expansion balloon, 166, 170, 172
Urinary calculi, 59, 67–70, 224, 225
Urinary diversions, 13–15, 149
Urodynamic evaluation, 62, 170
Urolithiasis, 70, 224–225
Urology
  history, 3, 93–94, 123, 175, 197–198, 209, 251–252, 259
  simulation in, 259–266

URO Mentor™, 265
Uro-Scopic trainer™, 265
Urothelial imaging, 225
Uro-Trainer™, 265
US machine, 217, 219
Uterus, 12, 15, 38, 152
Utilization of ultrasmall supermagnetic iron oxides (USPIOs), 273

V
Vacuum-insulated needle delivery system, 94
Vaginal disorders, 151
Van Velthoven vesicourethral anastomosis, 9
Vascular targeted photodynamic therapy (VTP)
  biology, 110
  focal, 111
Verification hardware description language (VHDL), 53, 271–272
Very large system integration (VLSI) design, 53, 271
Virtual reality (VR) simulators. See Simulators

Y
Y-V plasty, 23

Z
Zeus™, 52
Zeus robotic system, 43, 253–254