Chapter 11: Asian facial cosmetic surgery

1.1: Medial epicanthoplasty
1.2: Eyelidplasty: Non-incisional method
1.3: Rhinoplasty
1.4: Subclinical ptosis correction (total)
1.5: Secondary rhinoplasty: Septal extension graft and costal cartilage strut fixed with K-wire

Kyung S. Koh, Jong Woo Choi, and Clyde H. Ishii

Chapter 12: Neck rejuvenation

12.1: Anterior lipectomy

James E. Zins, Colin M. Morrison, and C. J. Langevin

Chapter 13: Structural fat grafting

13.1: Structural fat grafting of the face

Sydney R. Coleman and Alesia P. Saboeiro

Chapter 14: Skeletal augmentation

14.1: Chin implant
Michael J. Yarumchuk

14.2: Mandibular angle implant

14.3: Midface skeletal augmentation and rejuvenation
Michael J. Yarumchuk
© Michael J. Yaremchuk

Chapter 16: Open technique rhinoplasty

16.1: Open technique rhinoplasty

Allen L. Van Beek

Chapter 20: Otoplasty and ear reduction

20.1: Setback otoplasty

Leila Kasrai

Chapter 23: Abdominoplasty procedures

23.1: Abdominoplasty

Dirk F. Richter and Alexander Stoff

Chapter 24: Lipoabdominoplasty

24.1: Lipoabdominoplasty (including secondary lipo)

Osvaldo Saldanha, Sérgio Fernando Dantas de Azevedo, Osvaldo Ribeiro Saldanha Filho, Cristianna Bonnetto Saldanha, and Luis Humberto Uribe Morelli

Chapter 26.2: Buttock augmentation: Buttock augmentation with implants

26.2.1: Buttock augmentation

Terrence W. Bruner, Jose Abel De la Peña Salcedo, Constantino G. Mendieta, and Thomas L. Roberts III
Chapter 28: Post-bariatric reconstruction
28.1: Post-bariatric reconstruction – bodylift procedure
J. Peter Rubin and Jonathan W. Toy
© J. Peter Rubin

Volume Three:
Chapter 6: Aesthetic nasal reconstruction
6.1: The three-stage folded forehead flap for cover and lining
Frederick J. Menick
6.2: First-stage transfer and intermediate operation

Chapter 7: Auricular construction
7.1: Total auricular construction
Akira Yamada

Chapter 8: Acquired cranial and facial bone deformities
8.1: Removal of venous malformation enveloping intracranial optic nerve
Renee M. Burke, Robert J. Morin, and S. Anthony Wolfe

Chapter 13: Facial paralysis
13.1: Facial paralysis
Eyal Gur
13.2: Facial paralysis
13.3: Cross facial nerve graft
13.4: Gracilis harvest
Peter C. Neligan

Chapter 14: Pharyngeal and esophageal reconstruction
14.1: Reconstruction of pharyngoesophageal defects with the anterolateral thigh flap
Peirong Yu

Chapter 15: Tumors of the facial skeleton: Fibrous dysplasia
15.1: Surgical approaches to the facial skeleton
Yu-Ray Chen, You-Wei Cheong, and Alberto Córdova-Aguilar

Chapter 17: Local flaps for facial coverage
17.1: Facial artery perforator flap
17.2: Local flaps for facial coverage
Peter C. Neligan

Chapter 21.2: Rotation advancement cheiloplasty
21.2.1: Repair of unilateral cleft lip
Philip Kuo-Ting Chen, M. Samuel Noordhoff, Frank Chun-Shin Chang, and Fuan Chiang Chan
21.2.2: Unilateral cleft lip repair – anatomic subunit approximation technique
David M. Fisher

Chapter 24: Alveolar clefts
24.1: Unilateral cleft alveolar bone graft
24.2: Mobilized premaxilla after vomer osteotomy prior to setback and splint application
Richard A. Hopper and Gerhard S. Mundinger

Chapter 26: Velopharyngeal dysfunction
26.1: Velopharyngeal incompetence – 1
26.2: Velopharyngeal incompetence – 2
26.3: Velopharyngeal incompetence – 3
Richard E. Kirschner and Adriane L. Baylis

Chapter 27: Secondary deformities of the cleft lip, nose, and palate
27.1: Abbé flap
27.2: Alveolar bone grafting
27.3: Complete takedown
27.4: Definitive rhinoplasty
Evan M. Feldman, John C. Koshy, Larry H. Hollier Jr., and Samuel Stal
27.5: Thick lip and buccal sulcus deformities
Evan M. Feldman and John C. Koshy

Chapter 36: Pierre Robin Sequence
36.1: Mandibular distraction
Arun K. Gosain and Chad A. Purnell

Chapter 39: Vascular anomalies
39.1: Lip hemangioma
Arun K. Green

Chapter 43: Reconstruction of urogenital defects: Congenital
43.1: First-stage hypospadias repair with free inner preputial graft
43.2: Second-stage hypospadias repair with tunica vaginalis flap
Mohan S. Gundeti and Michael C. Large

Volume Four:
Chapter 2: Management of lower extremity trauma
2.1: Anterolateral thigh flap harvest
Michel Saint-Cyr

Chapter 3: Lymphatic reconstruction of the extremities
3.1: End-to-side lymphovenous bypass technique
3.2: Recipient site preparation for vascularized lymph node transfer – axilla
3.3: Indocyanine green lymphography
David W. Chang
3.4: Charles procedure
Peter C. Neligan

Chapter 6: Diagnosis and treatment of painful neuroma and nerve compression in the lower extremity
6.1: Diagnosis and treatment of painful neuroma and of nerve compression in the lower extremity 1
6.2: Diagnosis and treatment of painful neuroma and of nerve compression in the lower extremity 2
6.3: Diagnosis and treatment of painful neuroma and of nerve compression in the lower extremity
A. Lee Dellon

Chapter 7: Skeletal reconstruction

7.1: Medial femoral condyle/medial geniculate artery osteocutaneous free flap dissection for scaphoid nonunion
Stephen J. Kovach III and L. Scott Levin

Chapter 10: Reconstruction of the chest

10.1: Sternal rigid fixation
David H. Song and Michelle C. Roughton

Chapter 12: Abdominal wall reconstruction

12.1: Component separation innovation
Peter C. Neligan

Chapter 13: Reconstruction of male genital defects

13.1: Complete and partial penile reconstruction
Stan Monstrey, Peter Ceulemans, Nathalie Roche, Philippe Houtmeyers, Nicolas Lumen, and Piet Hoebeke

Volume Five:

Chapter 6: Mastopexy options and techniques

6.1: Circumareolar mastopexy
Kenneth C. Shestak

Chapter 7: One- and two-stage considerations for augmentation mastopexy

7.1: Preoperative markings for a single-stage augmentation mastopexy
W. Grant Stevens

Chapter 10: Reduction mammoplasty with short scar techniques

10.1: SPAIR technique
Dennis C. Hammond

Chapter 11: Gynecomastia surgery

11.1: Ultrasound-assisted liposuction
Charles M. Malata

Chapter 15: One- and two-stage prosthetic reconstruction in nipple-sparing mastectomy

15.1: Pectoralis muscle elevation
15.2: Acellular dermal matrix
15.3: Sizer
Amy S. Colwell

Chapter 16: Skin-sparing mastectomy: Planned two-stage and direct-to-implant breast reconstruction

16.1: Mastectomy and expander insertion: First stage
16.2: Mastectomy and expander insertion: Second stage
Maurizio B. Nava, Giuseppe Catanuto, Angela Pennati, Valentina Visintini Cividin, and Andrea Spano

Chapter 19: Latissimus dorsi flap breast reconstruction

19.1: Latissimus dorsi flap technique
Scott L. Spear
19.2: Markings
19.3: Intraoperative skin paddles
19.4: Tendon division
19.5: Transposition and skin paddles
19.6: Inset and better skin paddle explanation
Neil A. Fine and Michael S. Gart

Chapter 20.2: The deep inferior epigastric artery perforator (DIEAP) flap

20.2.1: The Deep Inferior Epigastric Artery Perforator (DIEAP) flap breast reconstruction
Phillip N. Blondeel and Robert J. Allen, Sr

Chapter 21.2: Gluteal free flaps for breast reconstruction

21.2.1: Superior Gluteal Artery Perforator (SGAP) flap
21.2.2: Inferior Gluteal Artery Perforator (IGAP) flap
Peter C. Neligan

Chapter 21.3: Medial thigh flaps for breast reconstruction

21.3.1: Transverse Upper Gracilis (TUG) flap
Peter C. Neligan
21.3.2: Transverse Upper Gracilis (TUG) flap
Venkat V. Ramakrishnan

Chapter 23.2: Partial breast reconstruction using reduction and mastopexy techniques

23.2.1: Partial breast reconstruction using reduction mammoplasty
Maurice Y. Nahabedian
23.2.2: Partial breast reconstruction with a latissimus dorsi flap
Neil A. Fine
23.2.3: Partial breast reconstruction with a pedicle TRAM
Maurice Y. Nahabedian

Volume Six:

Chapter 1: Anatomy and biomechanics of the hand

1.1: The extensor tendon compartments
1.2: The contribution of the interosseous and lumbrical muscles to the lateral bands
1.3: Extrinsic flexors and surrounding vasculonervous elements, from superficial to deep
1.4: The lumbrical plus deformity
1.5: The sensory and motor branches of the median nerve in the hand
James Chang, Vincent R. Hentz, Robert A. Chase, and Anais Legrand

Chapter 2: Examination of the upper extremity

2.1: Flexor profundus test in a normal long finger
2.2: Flexor sublimis test in a normal long finger
2.3: Extensor pollicis longus test in a normal person
2.4: Test for the Extensor Digitorum Communis (EDC) muscle in a normal hand
2.5: Test for assessing thenar muscle function
2.6: The “cross fingers” sign
2.7: Static Two-Point Discrimination Test (s-2PD Test)
2.8: Moving 2PD Test (m-2PD Test) performed on the radial or ulnar aspect of the finger
Chapter 3: Diagnostic imaging of the hand and wrist

3.1: Scaphoid lunate dislocation
Alphonsus K. Chong and David M. K. Tan

3.2: Right wrist positive midcarpal catch up clunk
Alphonsus K. Chong

Chapter 4: Anesthesia for upper extremity surgery

4.1: Supraclavicular block
Subhro K. Sen

Chapter 5: Principles of internal fixation as applied to the hand and wrist

5.1: Dynamic compression plating and lag screw technique
Christopher Cox

5.2: Headless compression screw

5.3: Locking vs. non-locking plates
Jeffrey Yao and Jason R. Kang

Chapter 7: Hand fractures and joint injuries

7.1: Bennett reduction
7.2: Hemi-Hamate arthroplasty
Warren C. Hammer

Chapter 9: Flexor tendon injury and reconstruction

9.1: Zone II flexor tendon repair
9.2: Incision and feed tendon forward
9.3: Distal tendon exposure
9.4: Six-strand M-tang repair
9.5: Extension-flexion test – wide awake
Jin Bo Tang

Chapter 10: Extensor tendon injuries

10.1: Sagittal band reconstruction
10.2: Setting the tension in extensor indicis transfer
Kai Megerle

Chapter 11: Replantation and revascularization

11.1: Hand replantation
James Chang

Chapter 12: Reconstructive surgery of the mutilated hand

12.1: Debridement technique
James Chang

Chapter 13: Thumb reconstruction: Non-microsurgical techniques

13.1: Osteoplastic thumb reconstruction
13.2: First Dorsal Metacarpal Artery (FDMA) flap
Jeffrey B. Friedrich

Chapter 14: Thumb reconstruction: Microsurgical techniques

14.1: Trimmed great toe
14.2: Second toe for index finger
14.3: Combined second and third toe for metacarpal hand
Nidal F. Al Deek

Chapter 19: Rheumatologic conditions of the hand and wrist

19.1: Extensor tendon rupture and end–side tendon transfer
James Chang

19.2: Silicone metacarpophalangeal arthroplasty
Kevin C. Chung and Evan Kowalski

Chapter 20: Osteoarthritis in the hand and wrist

20.1: Ligament reconstruction tendon interposition arthroplasty of the thumb carpometacarpal joint
James W. Fletcher

Chapter 21: The stiff hand and the spastic hand

21.1: Flexor pronator slide
David T. Netscher

Chapter 22: Ischemia of the hand

22.1: Radial artery sympathectomy
Hee Chang Ahn and Neil F. Jones

22.2: Interposition arterial graft and sympathectomy
Hee Chang Ahn

Chapter 24: Nerve entrapment syndromes

24.1: The manual muscle testing algorithm
24.2: Scratch collapse test – carpal tunnel
Elisabet Hagert

24.3: Injection technique for carpal tunnel surgery
24.4: Wide awake carpal tunnel surgery
Donald Lalonde

24.5: Clinical exam and surgical technique – lacertus syndrome
Elisabet Hagert

24.6: Injection technique for cubital tunnel surgery
24.7: Wide awake cubital tunnel surgery
Donald Lalonde

24.8: Clinical exam and surgical technique – radial tunnel syndrome
24.9: Clinical exam and surgical technique – lateral intermuscular syndrome
24.10: Clinical exam and surgical technique – axillary nerve entrapment
Elisabet Hagert

24.11: Carpal tunnel and cubital tunnel releases in the same patient in one procedure with field sterility: Part 1 – local anesthetic injection for carpal tunnel
24.12: Carpal tunnel and cubital tunnel releases in the same patient in one procedure with field sterility: Part 2 – local anesthetic injection for cubital tunnel
Donald Lalonde and Michael Bezuhly

Chapter 25: Congenital hand I: Embryology, classification, and principles

25.1: Pediatric trigger thumb release
James Chang
Chapter 27: Congenital hand III: Thumb hypoplasia

27.1: Thumb hypoplasia
Joseph Upton III and Amir Taghinia

Chapter 30: Growth considerations in pediatric upper extremity trauma and reconstruction

30.1: Epiphyseal transplant harvesting technique
Marco Innocenti and Carla Baldrighi

Chapter 31: Vascular anomalies of the upper extremity

31.1: Excision of venous malformation
Joseph Upton III and Amir Taghinia

Chapter 32: Peripheral nerve injuries of the upper extremity

32.1: Suture repair of the cut digital nerve
Simon Farnebo and Johan Thorfinn

Chapter 35: Free-functioning muscle transfer in the upper extremity

35.1: Gracilis functional muscle harvest
Gregory H. Borschel

Chapter 36: Brachial plexus injuries: Adult and pediatric

36.1: Pediatric: shoulder correct and biceps-to-triceps transfer with preserving intact brachialis
36.2: Adult: results of one-stage surgery for C5 rupture, C6–T1 root avulsion 10 years after
36.3: Nerve transfer results 1
36.4: Nerve transfer results 2
36.5: Nerve transfer results 3
36.6: Nerve transfer results 4
36.7: Nerve transfer results 5
David Chwei-Chin Chuang

Chapter 37: Restoration of upper extremity function in tetraplegia

37.1: The single-stage grip and release procedure
37.2: Postoperative results after single-stage grip release procedure in OCu3–5 patients
Carina Reinholdt and Catherine Curtin

Chapter 38: Upper extremity vascularized composite allotransplantation

38.1: Upper extremity composite tissue allotransplantation
W. P. Andrew Lee and Vijay S. Gorantla

Chapter 39: Hand therapy

39.1: Goniometric measurement
39.2: Threshold testing
Christine B. Novak and Rebecca L. Neiduski
<table>
<thead>
<tr>
<th>Volume One:</th>
<th>Volume Two:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chapter 1: Plastic surgery and innovation in medicine</td>
<td>Chapter 4: Skincare and nonsurgical skin rejuvenation</td>
</tr>
<tr>
<td>Plastic surgery and innovation in medicine</td>
<td>Skincare and nonsurgical skin rejuvenation</td>
</tr>
<tr>
<td>Peter C. Neligan</td>
<td>Leslie Baumann and Edmund Weisberg</td>
</tr>
<tr>
<td>Chapter 7: Digital imaging in plastic surgery</td>
<td>Chapter 5:2: Injectables and resurfacing techniques: Soft-tissue fillers</td>
</tr>
<tr>
<td>Digital imaging in plastic surgery</td>
<td>Soft-tissue fillers</td>
</tr>
<tr>
<td>Daniel Z. Liu</td>
<td>Trevor M. Born, Lisa E. Airan, and Daniel Suissa</td>
</tr>
<tr>
<td>Chapter 15: Skin graft</td>
<td>Chapter 5:3: Injectables and resurfacing techniques: Botulinum toxin (BoNT-A)</td>
</tr>
<tr>
<td>Skin graft</td>
<td>Botulinum toxin</td>
</tr>
<tr>
<td>Peter C. Neligan</td>
<td>Michael A. C. Kane</td>
</tr>
<tr>
<td>Chapter 19: Repair and grafting of peripheral nerve</td>
<td>Chapter 5:4: Injectables and resurfacing techniques: Laser resurfacing</td>
</tr>
<tr>
<td>Nerve injury and repair</td>
<td>Laser resurfacing</td>
</tr>
<tr>
<td>Kirsty Usher Boyd, Andrew Yee, and Susan E. Mackinnon</td>
<td>Steven R. Cohen, Ahmad N. Saad, Tracy Leong, and E. Victor Ross</td>
</tr>
<tr>
<td>Chapter 20: Reconstructive fat grafting</td>
<td>Chapter 5:5: Injectables and resurfacing techniques: Chemical peels</td>
</tr>
<tr>
<td>Reconstructive fat grafting</td>
<td>Chemical peels</td>
</tr>
<tr>
<td>J. Peter Rubin</td>
<td>Suzan Obagi</td>
</tr>
<tr>
<td>Vascular territories</td>
<td>Anatomy of the aging face</td>
</tr>
<tr>
<td>Steven F. Morris</td>
<td>Bryan Mendelson and Chin-Ho Wong</td>
</tr>
<tr>
<td>Chapter 22: Flap classification and applications</td>
<td>Chapter 6:2: Facelift: Principles of and surgical approaches to facelift</td>
</tr>
<tr>
<td>Flap classification and applications</td>
<td>Principles of and surgical approaches to facelift</td>
</tr>
<tr>
<td>Joon Pio Hong</td>
<td>Richard J. Warren</td>
</tr>
<tr>
<td>Chapter 23: Flap pathophysiology and pharmacology</td>
<td>Chapter 6:3: Facelift: Platysma-SMAS plication</td>
</tr>
<tr>
<td>Flap pathophysiology and pharmacology</td>
<td>Platysma-SMAS plication</td>
</tr>
<tr>
<td>Cho Y. Pang and Peter C. Neligan</td>
<td>Miles G. Berry</td>
</tr>
<tr>
<td>Chapter 24: Principles and techniques of microvascular surgery</td>
<td></td>
</tr>
<tr>
<td>Principles and techniques of microvascular surgery</td>
<td></td>
</tr>
<tr>
<td>Fu-Chan Wei, Nidal F. Al Deek, and Sherlyn Keng Lin Tay</td>
<td></td>
</tr>
<tr>
<td>Chapter 25: Principles and applications of tissue expansion</td>
<td></td>
</tr>
<tr>
<td>Principles and applications of tissue expansion</td>
<td></td>
</tr>
<tr>
<td>Ivo Alexander Pestana, Louis C. Argenta, and Malcolm W. Marks</td>
<td></td>
</tr>
<tr>
<td>Chapter 26: Principles of radiation</td>
<td></td>
</tr>
<tr>
<td>Therapeutic radiation: principles, effects, and complications</td>
<td></td>
</tr>
<tr>
<td>Gabrielle M. Kane</td>
<td></td>
</tr>
</tbody>
</table>
Volume Three:

Chapter 10.3: Midface reconstruction: The M. D. Anderson approach
Midfacial reconstruction: The M. D. Anderson approach
Matthew M. Hanasono and Roman Skoracki

Chapter 12: Lip reconstruction
Lip reconstruction
Peter C. Neligan and Lawrence J. Gottlieb

Chapter 14: Pharyngeal and esophageal reconstruction
Pharyngoesophageal reconstruction
Peirong Yu

Chapter 15: Tumors of the facial skeleton: Fibrous dysplasia
Fibrous dysplasia
Alberto Córdova-Aguilar and Yu-Ray Chen

Chapter 17: Local flaps for facial coverage
Local flaps for facial coverage
David W. Mathes

Chapter 19: Facial transplant
Facial transplant
Michael Sosin and Eduardo D. Rodriguez

Chapter 32: Nonsyndromic craniosynostosis
Nonsyndromic craniosynostosis
Patrick A. Gerety, Jesse A. Taylor, and Scott P. Bartlett

Chapter 36: Pierre Robin Sequence
Pierre Robin sequence
Chad A. Purnell and Arun K. Gosain

Chapter 39: Vascular anomalies
Vascular anomalies
Anir K. Greene and John B. Mulliken

Volume Four:

Chapter 2: Management of lower extremity trauma
Management of lower extremity trauma
Yoo Joon Sur, Shannon M. Colohan, and Michel Saint-Cyr

Chapter 15: Surgery for gender identity disorder
Surgery for gender identity disorder
Loren S. Schechter

Chapter 16: Pressure sores
Pressure sores
Robert Kwon, Juan L. Rendon, and Jeffrey E. Janis

Chapter 17: Perineal reconstruction
Perineal reconstruction
Hakim K. Said and Otway Louie

Volume Five:

Chapter 5: Breast augmentation with autologous fat grafting
Breast augmentation with autologous fat grafting
E. Delay

Chapter 6: Mastopexy options and techniques
Mastopexy
Robert Cohen

Chapter 9: Reduction mammaplasty with inverted-T techniques
Reduction mammaplasty with inverted-T techniques
Maurice Y. Nahabedian

Chapter 15: One- and two-stage prosthetic reconstruction in nipple-sparing mastectomy
Prosthetic reconstruction in nipple-sparing mastectomy
Amy S. Colwell

Chapter 20.1: Abdominally based free flaps: Introduction
Abdominally-based autologous breast reconstruction
Maurice Y. Nahabedian, Phillip N. Blondeel, and David H. Song

Chapter 20.2: The deep inferior epigastric artery perforator (DIEAP) flap
Abdominally-based autologous breast reconstruction
Maurice Y. Nahabedian, Phillip N. Blondeel, and David H. Song

Chapter 20.3: The superficial inferior epigastric artery (SIEA) flap
Abdominally-based autologous breast reconstruction
Maurice Y. Nahabedian, Phillip N. Blondeel, and David H. Song

Chapter 20.4: The free TRAM flap
Abdominally-based autologous breast reconstruction
Maurice Y. Nahabedian, Phillip N. Blondeel, and David H. Song

Chapter 25: Radiation therapy considerations in the setting of breast reconstruction
Radiation therapy in breast reconstruction
Steven Kronowitz

Volume Six:

Chapter 7: Hand fractures and joint injuries
Hand fractures and joint injuries
Joseph S. Khouri and Warren C. Hammet

Chapter 13: Thumb reconstruction: Non-microsurgical techniques
Thumb reconstruction
Nicholas B. Vedder and Jeffrey B. Friedrich

Chapter 21: The stiff hand and the spastic hand
The stiff hand
David T. Netscher, Kenneth W. Donohue, and Dang T. Pham
Chapter 24: Nerve entrapment syndromes
Tips and pearls on common nerve compressions
Elisabet Hagert and Donald Lalonde

Chapter 30: Growth considerations in pediatric upper extremity trauma and reconstruction
Growth considerations in pediatric upper extremity trauma and reconstruction
Marco Innocenti and Carla Baldrighi

Chapter 33: Nerve transfers
Nerve injury and repair
Kirsty Usher Boyd, Andrew Yee, and Susan E. Mackinnon

Chapter 37: Restoration of upper extremity function in tetraplegia
Restoration of upper extremity function in tetraplegia
Carina Reinholdt and Catherine Curtin
When I wrote the preface to the 3rd edition of this book, I remarked how honored and unexpectedly surprised I was to be the Editor of this great series. This time 'round, I'm equally grateful to carry this series forward. When Elsevier called me and suggested it was time to prepare the 4th edition, my initial reaction was that this was way too soon. What could possibly have changed in Plastic Surgery since the 3rd edition was launched in 2012? As it transpires, there have been many developments and I hope we have captured them in this edition.

We have an extraordinary specialty. A recent article by Chadra, Agarwal and Agarwal entitled “Redefining Plastic Surgery” appeared in Plastic and Reconstructive Surgery—Global Open. In it they gave the following definition: “Plastic surgery is a specialized branch of surgery, which deals with deformities, defects and abnormalities of the organs of perception, organs of action and the organs guarding the external passages, besides innovation, implantation, replantation and transplantation of tissues, and aims at restoring and improving their form, function and the esthetic appearances.” This is an all-encompassing but very apt definition and captures the enormous scope of the specialty.1

In the 3rd edition, I introduced volume editors for each of the areas of the specialty because the truth is that one person can no longer be an expert in all areas of this diverse specialty, and I’m certainly not. I think this worked well because the volume editors not only had the expertise to present their area of subspecialty in the best light, but they were tuned in to what was new and who was doing it. We have continued this model in this new edition. Four of the seven volume editors from the previous edition have again helped to bring the latest and the best to this edition: Drs Gurtner, Song, Rodriguez, Losee, and Chang have revised and updated their respective volumes with some chapters remaining, some extensively revised, some added, and some deleted. Dr. Peter Rubin has replaced Dr. Rick Warren to compile the Aesthetic volume (Vol. 2). Dr. Warren did a wonderful job in coralling this somewhat disparate, yet vitally important, part of our specialty into the Aesthetic volume in the 3rd edition but felt that the task of doing it again, though a labor of love, was more than he wanted to take on. Similarly, Dr. Jim Grotting who did a masterful job in the last edition on the Breast volume, decided that doing a major revision should be undertaken by someone with a fresh perspective and Dr. Maurice Nahabedian stepped into that breach. I hope you will like the changes you see in both of these volumes.

Dr. Allen Van Beek was the video editor for the last edition and he compiled an impressive array of movies to complement the text. This time around, we wanted to go a step further and though we’ve considerably expanded the list of videos accompanying the text (there are over 170), we also added the idea of lectures accompanying selected chapters. What we’ve done here is to take selected key chapters and include the images from that chapter, photos and artwork, and create a narrated presentation that is available online; there are annotations in the text to alert the reader that this is available. Dr. Daniel Liu, who has taken over from Dr. Van Beek as multimedia editor (rather than video editor) has done an amazing job in making all of this happen. There are over 70 presentations of various key chapters online, making it as easy as possible for you, the reader, to get as much knowledge as you can, in the easiest way possible from this edition. Many of these presentations have been done by the authors of the chapters; the rest have been compiled by Dr. Liu and myself from the content of the individual chapters. I hope you find them useful.

The reader may wonder how this all works. To plan this edition, the Elsevier team, headed by Belinda Kuhn, and I, convened a face-to-face meeting in San Francisco. The volume editors, as well as the London based editorial team, were present. We went through the 3rd edition, volume by volume, chapter by chapter, over an entire weekend. We decided what needed to stay, what needed to be added, what needed to be revised, and what needed to be changed. We also decided who should write the various chapters, keeping many existing authors, replacing others, and adding some new ones; we did this so as to really reflect the changes occurring within the specialty. We also decided on practical changes that needed to be made. As an example, you will notice that we have omitted the complete index for the 6 Volume set from Volumes 2-6 and highlighted only the table of contents for that particular volume. The complete index is of course available in Volume 1 and fully searchable online. This allowed us to save several hundred pages per volume, reducing production costs and diverting those dollars to the production of the enhanced online content.

In my travels around the world since the 3rd edition was published, I’ve been struck by what an impact this publication has had on the specialty and, more particularly, on training. Everywhere I go, I’m told how the text is an important part of didactic teaching and a font of knowledge. It is gratifying to see that the 3rd edition has been translated into Portuguese, Spanish, and Chinese. This is enormously encouraging. I hope this 4th edition continues to contribute to the specialty, remains a resource for practicing surgeons, and continues to prepare our trainees for their future careers in Plastic Surgery.

Peter C. Neligan
Seattle, WA
September, 2017

List of Editors

Editor-in-Chief
Peter C. Neligan, MB, FRCS(I), FRCSC, FACS
Professor of Surgery
Department of Surgery, Division of Plastic Surgery
University of Washington
Seattle, WA, USA

Volume 1: Principles
Geoffrey C. Gurtner, MD, FACS
Johnson and Johnson Distinguished Professor of Surgery and Vice Chairman,
Department of Surgery (Plastic Surgery)
Stanford University
Stanford, CA, USA

Volume 2: Aesthetic
J. Peter Rubin, MD, FACS
UPMC Professor of Plastic Surgery
Chair, Department of Plastic Surgery
Professor of Bioengineering
University of Pittsburgh
Pittsburgh, PA, USA

Volume 3: Craniofacial, Head and Neck Surgery
Eduardo D. Rodriguez, MD, DDS
Helen L. Kimmel Professor of Reconstructive Plastic Surgery
Chair, Hansjörg Wyss Department of Plastic Surgery
NYU School of Medicine
NYU Langone Medical Center
New York, NY, USA

Volume 3: Pediatric Plastic Surgery
Joseph E. Losee, MD
Ross H. Musgrave Professor of Pediatric Plastic Surgery
Department of Plastic Surgery
University of Pittsburgh Medical Center;
Chief Division of Pediatric Plastic Surgery
Children’s Hospital of Pittsburgh
Pittsburgh, PA, USA

Volume 4: Lower Extremity, Trunk, and Burns
David H. Song, MD, MBA, FACS
Regional Chief, MedStar Health
Plastic and Reconstructive Surgery
Professor and Chairman
Department of Plastic Surgery
Georgetown University School of Medicine
Washington, DC, USA

Volume 5: Breast
Maurice Y. Nahabedian, MD, FACS
Professor and Chief
Section of Plastic Surgery
MedStar Washington Hospital Center
Washington, DC, USA;
Vice Chairman
Department of Plastic Surgery
MedStar Georgetown University Hospital
Washington, DC, USA

Volume 6: Hand and Upper Extremity
James Chang, MD
Johnson & Johnson Distinguished Professor and Chief
Division of Plastic and Reconstructive Surgery
Stanford University Medical Center
Stanford, CA, USA

Multimedia editor
Daniel Z. Liu, MD
Plastic and Reconstructive Surgeon
Cancer Treatment Centers of America at Midwestern Regional Medical Center
Zion, IL, USA
List of Contributors

The editors would like to acknowledge and offer grateful thanks for the input of all previous editions' contributors, without whom this new edition would not have been possible.

VOLUME ONE

Hatem Abou-Sayed, MD, MBA
Vice President
Physician Engagement
Interpreta, Inc.
San Diego, CA, USA

Paul N. Afrooz, MD
Resident
Plastic and Reconstructive Surgery
University of Pittsburgh Medical Center
Pittsburgh, PA, USA

Claudia R. Albornoz, MD, MSc
Research Fellow
Plastic and Reconstructive Surgery
Memorial Sloan Kettering Cancer Center
New York, NY, USA

Nidal F. Al Deek, MD
Doctor of Plastic and Reconstructive Surgery
Chang Gung Memorial Hospital
Taipei, Taiwan

Amy K. Alderman, MD, MPH
Private Practice
Atlanta, GA, USA

Louis C. Argenta, MD
Professor of Plastic and Reconstructive Surgery
Department of Plastic Surgery
Wake Forest Medical Center
Winston Salem, NC, USA

Stephan Ariyan, MD, MBA
Emeritus Frank F. Kanthak Professor of Surgery,
Plastic Surgery, Surgical Oncology,
Otolaryngology
Yale University School of Medicine;
Associate Chief
Department of Surgery;
Founding Director, Melanoma Program
Smilow Cancer Hospital, Yale Cancer Center
New Haven, CT, USA

Tomer Avraham, MD
Attending Plastic Surgeon
Mount Sinai Health System
Tufts University School of Medicine
New York, NY, USA

Aaron Berger, MD, PhD
Clinical Assistant Professor
Division of Plastic Surgery
Florida International University School of Medicine
Miami, FL, USA

Kirsty Usher Boyd, MD, FRCSC
Assistant Professor Surgery (Plastics)
Division of Plastic and Reconstructive Surgery
University of Ottawa
Ottawa, Ontario, Canada

Charles E. Butler, MD, FACS
Professor and Chairman
Department of Plastic Surgery
Charles B. Barker Endowed Chair in Surgery
The University of Texas MD Anderson Cancer Center
Houston, TX, USA

Peter E. M. Butler, MD, FRCSI, FRCS, FRCS(Plast)
Professor
Plastic and Reconstructive Surgery
University College and Royal Free London
London, UK

Yilin Cao, MD, PhD
Professor
Shanghai Ninth People’s Hospital
Shanghai Jiao Tong University School of Medicine
Shanghai, China

Franklyn P. Cladis, MD, FAAP
Associate Professor of Anesthesiology
Department of Anesthesiology
The Children’s Hospital of Pittsburgh of UPMC
Pittsburgh, PA, USA

Mark B. Constantian, MD
Private Practice
Surgery (Plastic Surgery)
St. Joseph Hospital
Nashua, NH, USA

Daniel A. Cuzzone, MD
Plastic Surgery Fellow
Hanjörg Wyss Department of Plastic Surgery
New York University Medical Center
New York, NY, USA

Gurleen Dhami, MD
Chief Resident
Department of Radiation Oncology
University of Washington
Seattle, WA, USA

Gayle Gordillo, MD
Associate Professor
Plastic Surgery
The Ohio State University
Columbus, OH, USA

Geoffrey C. Gurtner, MD, FACS
Johnson and Johnson Distinguished Professor of Surgery and Vice Chairman,
Department of Surgery (Plastic Surgery)
Stanford University
Stanford, CA, USA

Phillip C. Haeck, MD
Surgeon
Plastic Surgery
The Polyclinic
Seattle, WA, USA

The late Bruce Halperin†, MD
Formerly Adjunct Associate Professor of Anesthesiology
Department of Anesthesia
Stanford University
Stanford, CA, USA

Daniel E. Heath
Lecturer
School of Chemical and Biomedical Engineering
University of Melbourne
Parkville, Victoria, Australia

Joon Pio Hong, MD, PhD, MMM
Professor
Plastic Surgery
Asan Medical Center, University of Ulsan
Seoul, South Korea

Michael S. Hu, MD, MPH, MS
Postdoctoral Fellow
Division of Plastic Surgery
Department of Surgery
Stanford University School of Medicine
Stanford, CA, USA

C. Scott Hultman, MD, MBA
Professor and Chief
Division of Plastic and Reconstructive Surgery
University of North Carolina
Chapel Hill, NC, USA

Amir E. Ibrahim
Division of Plastic Surgery
Department of Surgery
American University of Beirut Medical Center
Beirut, Lebanon

Leila Jazayeri, MD
Microsurgery Fellow
Plastic and Reconstructive Surgery
Memorial Sloan Kettering Cancer Center
New York, NY, USA
<table>
<thead>
<tr>
<th>Name</th>
<th>Title and Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brian Jeffers</td>
<td>Student, Bioengineering, University of California Berkeley, Berkeley, CA USA</td>
</tr>
<tr>
<td>Lynn Jeffers, MD, FACS</td>
<td>Private Practice, Oxnard, CA, USA</td>
</tr>
<tr>
<td>Mohammed M. Al Kahtani, MD, FRCSC</td>
<td>Clinical Fellow, Division of Plastic Surgery, Department of Surgery, University of Alberta, Edmonton, Alberta, Canada</td>
</tr>
<tr>
<td>Gabrielle M. Kane, MB, BCh, EdD, FRCP</td>
<td>Associate Professor, Radiation Oncology, University of Washington, Seattle, WA, USA</td>
</tr>
<tr>
<td>Raghu P. Kataru, PhD</td>
<td>Senior Research Scientist, Memorial Sloan-Kettering Cancer Center, New York, NY, USA</td>
</tr>
<tr>
<td>Carolyn L. Kerrigan, MD, MSc, MHCDS</td>
<td>Professor of Surgery, Dartmouth–Hitchcock Medical Center, Lebanon, NH, USA</td>
</tr>
<tr>
<td>Timothy W. King, MD, PhD, FAAP, FACS</td>
<td>Associate Professor with Tenure, Departments of Surgery and Biomedical Engineering, Director of Research, Division of Plastic Surgery, University of Alabama at Birmingham (UAB), Craniofacial and Pediatric Plastic Surgery, Children’s of Alabama – Plastic Surgery, Chief, Plastic Surgery Section, Birmingham VA Hospital, Birmingham, AL, USA</td>
</tr>
<tr>
<td>Brian M. Kinney, MD, FACS, MSME</td>
<td>Clinical Assistant Professor of Plastic Surgery, University of Southern California, School of Medicine, Los Angeles, CA, USA</td>
</tr>
<tr>
<td>W. P. Andrew Lee, MD</td>
<td>The Milton T. Edgerton MD, Professor and Chairman, Department of Plastic and Reconstructive Surgery, Johns Hopkins University School of Medicine, Baltimore, MD, USA</td>
</tr>
<tr>
<td>Sherilyn Keng Lin Tay, MBChB, MSc, FRCS(Plast)</td>
<td>Consultant Plastic Surgeon, Canniesburn Plastic Surgery Unit, Glasgow Royal Infirmary, Glasgow, UK</td>
</tr>
<tr>
<td>Daniel Z. Liu, MD</td>
<td>Plastic and Reconstructive Surgeon, Cancer Treatment Centers of America at Midwestern Regional Medical Center, Zion, IL, USA</td>
</tr>
<tr>
<td>Wei Liu, MD, PhD</td>
<td>Professor, Plastic and Reconstructive Surgery, Shanghai Ninth People’s Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai, China</td>
</tr>
<tr>
<td>Michael T. Longaker, MD, MBA, FACS</td>
<td>Deane P. and Louise Mitchell Professor and Vice Chair, Department of Surgery, Stanford University, Stanford, CA, USA</td>
</tr>
<tr>
<td>H. Peter Lorenz, MD</td>
<td>Service Chief and Professor, Plastic Surgery, Lucile Packard Children’s Hospital, Stanford University School of Medicine, Stanford, CA, USA</td>
</tr>
<tr>
<td>Susan E. Mackinnon, MD</td>
<td>Sydney M. Shoenberg Jr. and Robert H. Shoenberg Professor, Department of Surgery, Division of Plastic and Reconstructive Surgery, Washington University School of Medicine, St. Louis, MO, USA</td>
</tr>
<tr>
<td>Malcolm W. Marks, MD</td>
<td>Professor and Chairman, Department of Plastic Surgery, Wake Forest University School of Medicine, Winston-Salem, NC, USA</td>
</tr>
<tr>
<td>Diego Marre, MD</td>
<td>Fellow, O’Brien Institute, Department of Plastic and Reconstructive Surgery, St. Vincent’s Hospital, Melbourne, Australia</td>
</tr>
<tr>
<td>David W. Mathes, MD</td>
<td>Professor and Chief of the Division of Plastic and Reconstructive Surgery, University of Colorado, Aurora, CO, USA</td>
</tr>
<tr>
<td>Evan Matros MD, MMSc</td>
<td>Plastic Surgeon, Memorial Sloan-Kettering Cancer Center, New York, NY, USA</td>
</tr>
<tr>
<td>Isabella C. Mazzola, MD</td>
<td>Attending Plastic Surgeon, Klinik für Plastische und Ästhetische Chirurgie, Klinikum Landkreis Erding, Erding, Germany</td>
</tr>
<tr>
<td>Riccardo F. Mazzola, MD</td>
<td>Plastic Surgeon, Department of Specialistic Surgical Sciences, Fondazione Ospedale Maggiore Policlinico, Ca’ Granda IRCCS, Milano, Italy</td>
</tr>
<tr>
<td>Lindsay D. McHutchion, MS, BSc</td>
<td>Anaplastologist, Institute for Reconstructive Sciences in Medicine, Edmonton, Alberta, Canada</td>
</tr>
<tr>
<td>Babak J. Mehrara, MD, FACS</td>
<td>Associate Member, Associate Professor of Surgery (Plastic), Memorial Sloan Kettering Cancer Center, Weil Cornell University Medical Center, New York, NY, USA</td>
</tr>
<tr>
<td>Steven F. Morris, MD, MSc, FRCSC</td>
<td>Professor of Surgery, Department of Surgery, Dalhousie University, Halifax, Nova Scotia, Canada</td>
</tr>
<tr>
<td>Wayne A. Morrison, MBBS, MD, FRACS</td>
<td>Professorial Fellow, O’Brien Institute, Department of Surgery, University of Melbourne, Department of Plastic and Reconstructive Surgery, St. Vincent’s Hospital, Melbourne, Australia</td>
</tr>
<tr>
<td>Peter C. Neligan, MB, FRCIS(l), FRCSC, FACS</td>
<td>Professor of Surgery, Department of Surgery, Division of Plastic Surgery, University of Washington, Seattle, WA, USA</td>
</tr>
<tr>
<td>Andrea J. O’Connor, BE(Hons), PhD</td>
<td>Associate Professor, Department of Chemical and Biomolecular Engineering, University of Melbourne, Parkville, Victoria, Australia</td>
</tr>
<tr>
<td>Rei Ogawa, MD, PhD, FACS</td>
<td>Professor and Chief, Department of Plastic Reconstructive and Aesthetic Surgery, Nippon Medical School, Tokyo, Japan</td>
</tr>
<tr>
<td>Dennis P. Orgill, MD, PhD</td>
<td>Professor of Surgery, Harvard Medical School, Medical Director, Wound Care Center; Vice Chairman for Quality Improvement, Department of Surgery, Brigham and Women’s Hospital, Boston, MA, USA</td>
</tr>
</tbody>
</table>
Cho Y. Pang, PhD
Senior Scientist
Research Institute
The Hospital for Sick Children;
Professor
Departments of Surgery/Physiology
University of Toronto
Toronto, Ontario, Canada

Ivo Alexander Pestana, MD, FACS
Associate Professor
Plastic and Reconstructive Surgery
Wake Forest University
Winston Salem, NC, USA

Giorgio Pietramaggiore, MD, PhD
Swiss Nerve Institute
Clinique de La Source
Lausanne, Switzerland

Andrea L. Pusic, MD, MHS, FACS
Associate Professor
Plastic and Reconstructive Surgery
Memorial Sloan Kettering Cancer Center
New York, NY, USA

Russell R. Reid, MD, PhD
Associate Professor
Surgery/Section of Plastic and Reconstructive Surgery
University of Chicago Medicine
Chicago, IL, USA

Neal R. Reisman, MD, JD
Chief
Plastic Surgery
Baylor St. Luke’s Medical Center
Houston, TX, USA

Joseph M. Rosen, MD
Professor of Surgery
Plastic Surgery
Dartmouth-Hitchcock Medical Center
Lebanon, NH, USA

Sashwati Roy, MS, PhD
Associate Professor
Surgery, Center for Regenerative Medicine and Cell based Therapies
The Ohio State University
Columbus, OH, USA

J. Peter Rubin, MD, FACS
UPMC Professor of Plastic Surgery
Chair, Department of Plastic Surgery
Professor of Bioengineering
University of Pittsburgh
Pittsburgh, PA, USA

Karim A. Sarhane, MD
Department of Surgery
University of Toledo Medical Center
Toledo, OH, USA

David B. Sarwer, PhD
Associate Professor of Psychology
Departments of Psychiatry and Surgery
University of Pennsylvania School of Medicine
Philadelphia, PA, USA

Saja S. Scherer-Pietramaggiore, MD
Plastic and Reconstructive Surgeon
Plastic Surgery
University Hospital Lausanne
Lausanne, Vaud, Switzerland

Iris A. Seitz, MD, PhD
Director of Research and International Collaboration
University Plastic Surgery
Rosalind Franklin University;
Clinical Instructor of Surgery
Chicago Medical School
Chicago, IL, USA

Jesse C. Selber, MD, MPH, FACS
Associate Professor, Director of Clinical Research
Department of Plastic Surgery
MD Anderson Cancer Center
Houston, TX, USA

Chandan K. Sen, PhD
Professor and Director
Center for Regenerative Medicine and Cell-Based Therapies
The Ohio State University Wexner Medical Center
Columbus, OH, USA

Wesley N. Sivak, MD, PhD
Resident in Plastic Surgery
Department of Plastic Surgery
University of Pittsburgh
Pittsburgh, PA, USA

M. Lucy Sudekum
Research Assistant
Thayer School of Engineering at Dartmouth College
Hanover, NH, USA

G. Ian Taylor, AO, MBBS, MD, MD(Hon Bordeaux), FRACS, FRCS(Eng), FRCS(Hon Edinburgh), FRCSI(Hon), FRSC(Hon Canada), FACS(Hon)
Professor
Department of Plastic Surgery
Royal Melbourne Hospital;
Professor
Department of Anatomy
University of Melbourne
Melbourne, Victoria, Australia

Chad M. Teven, MD
Resident
Section of Plastic and Reconstructive Surgery
University of Chicago
Chicago, IL, USA

Ruth Tevlin, MB BAO BCh, MRCSI, MD
Resident in Surgery
Department of Plastic and Reconstructive Surgery
Stanford University School of Medicine
Stanford, CA, USA

E. Dale Collins Vidal, MD, MS
Chief
Section of Plastic Surgery
Dartmouth-Hitchcock Medical Center
Lebanon, NH, USA

Derrick C. Wan, MD
Associate Professor
Division of Plastic Surgery
Department of Surgery
Director of Maxillofacial Surgery
Lucile Packard Children’s Hospital
Stanford University School of Medicine
Stanford, CA, USA

Renata V. Weber, MD
Assistant Professor Surgery (Plastics)
Division of Plastic and Reconstructive Surgery
Albert Einstein College of Medicine
Bronx, NY, USA

Fu-Chan Wei, MD
Professor
Department of Plastic Surgery
Chang Gung Memorial Hospital
Taoyuan, Taiwan

Gordon H. Wilkes, BScMed, MD
Clinical Professor of Surgery
Department of Surgery University of Alberta
Institute for Reconstrcutive Sciences in Medicine
Misericordia Hospital
Edmonton, Alberta, Canada

Johan F. Wolfaardt, BDS, MDCert(Prosthodontics), PhD
Professor
Division of Otolaryngology – Head and Neck Surgery
Department of Surgery
Faculty of Medicine and Dentistry;
Director of Clinics and International Relations
Institute for Reconstrcutive Sciences in Medicine
University of Alberta
Covenant Health Group
Alberta Health Services
Alberta, Canada

Kiryu K. Yap, MBBS, BMedSc
Junior Surgical Trainee & PhD Candidate
O’Brien Institute
Department of Surgery, University of Melbourne
Department of Plastic and Reconstructive Surgery, St. Vincent’s Hospital
Melbourne, Australia

Andrew Yee
Research Assistant
Division of Plastic and Reconstructive Surgery
Washington University School of Medicine
St. Louis, MO, USA

Elizabeth R. Zielins, MD
Postdoctoral Research Fellow
Surgery
Stanford University School of Medicine
Stanford, CA, USA
VOLUME TWO

Paul N. Afroz, MD
Resident
Plastic and Reconstructive Surgery
University of Pittsburgh Medical Center
Pittsburgh, PA, USA

Jamil Ahmad, MD, FRCSC
Director of Research and Education
The Plastic Surgery Clinic
Mississauga;
Assistant Professor
Surgery
University of Toronto
Toronto, Ontario, Canada

Lisa E. Airan, MD
Aesthetic Dermatologist NYC
Private Practice;
Associate Clinical Professor Department of Dermatology
Mount Sinai School of Medicine
New York, NY, USA

Gary J. Alter, MD
Assistant Clinical Professor
Division of Plastic Surgery
University of California
Los Angeles, CA, USA

Al S. Aly, MD
Professor of Plastic Surgery
Aesthetic and Plastic Surgery Institute University of California Irvine
Orange, CA, USA

Khalid Al-Zahrani, MD, SSC-PLAST
Assistant Professor
Consultant Plastic Surgeon
King Khalid University Hospital
King Saud University
Riyadh, Saudi Arabia

Bryan Armijo, MD
Plastic Surgery Chief Resident
Department of Plastic and Reconstructive Surgery
Case Western Reserve/University Hospitals
Cleveland, OH, USA

Daniel C. Baker, MD
Professor of Surgery
Institute of Reconstructive Plastic Surgery
New York University Medical Center
Department of Plastic Surgery
New York, NY, USA

Fritz E. Barton Jr., MD
Clinical Professor
Department of Plastic Surgery
UT Southwestern Medical Center
Dallas, TX, USA

Leslie Baumann, MD
CEO
Baumann Cosmetic and Research Institute
Miami, FL, USA

Miles G. Berry, MS, FRCS(Plast)
Consultant Plastic and Aesthetic Surgeon
Institute of Cosmetic and Reconstructive Surgery
London, UK

Trevor M. Born, MD
Division of Plastic Surgery
Lenox Hill/Manhattan Eye Ear and Throat Hospital North Shore-LIJ Hospital
New York, NY, USA;
Clinical Lecturer
Division of Plastic Surgery
University of Toronto Western Division
Toronto, Ontario, Canada

Terrence W. Bruner, MD, MBA
Private Practice
Greenville, SC, USA

Andrés F. Cánchica, MD
Chief Resident in Plastic Surgery
Plastic Surgery Service Dr. Osvaldo Saldanha
São Paulo, Brazil

Joseph F. Capella, MD
Chief Post- bariatric Body Contouring
Division of Plastic Surgery
Hackensack University Medical Center
Hackensack, NJ, USA

Robert F. Centeno, MD, MBA
Medical Director
St. Croix Plastic Surgery and MediSpa;
Chief Medical Quality Officer
Governor Juan F. Luis Hospital and Medical Center
Christiansted, Saint Croix, United States Virgin Islands

Ernest S. Chiu, MD, FACS
Associate Professor of Plastic Surgery
Department of Plastic Surgery
New York University
New York, NY, USA

Jong Woo Choi, MD, PhD, MMM
Associate Professor of Plastic Surgery
Department of Plastic and Reconstructive Surgery
Seoul Asan Medical Center
Seoul, South Korea

Steven R. Cohen, MD
Senior Clinical Research Fellow, Clinical Professor
Plastic Surgery
University of California
San Diego, CA;
Director
Craniofacial Surgery
Rady Children’s Hospital, Private Practice,
FACES+ Plastic Surgery, Skin and Laser Center
La Jolla, CA, USA

Sydney R. Coleman, MD
Assistant Clinical Professor
Plastic Surgery
New York University Medical Center
New York;
Assistant Clinical Professor
Plastic Surgery
University of Pittsburgh Medical Center
Pittsburgh, PA, USA

Mark B. Constantin, MD
Private Practice
Surgery (Plastic Surgery)
St. Joseph Hospital
Nashua, NH, USA;
Adjunct Clinical Professor
Surgery (Plastic Surgery)
University of Wisconsin School of Medicine
Madison, WI, USA;
Visiting Professor
Plastic Surgery
University of Virginia Health System
Charlottesville, VA, USA

Rafael A. Couto, MD
Plastic Surgery Resident
Department of Plastic Surgery
Cleveland Clinic
Cleveland, OH, USA

Albert Cram, MD
Professor Emeritus
University of Iowa
Iowa City Plastic Surgery
Coralville, IO, USA

Phillip Dauwe, MD
Department of Plastic Surgery
University of Texas Southwestern Medical School
Dallas, TX, USA

Dai M. Davies, FRCS
Consultant and Institute Director
Institute of Cosmetic and Reconstructive Surgery
London, UK

Jose Abel De la Peña Salcedo, MD, FACS
Plastic Surgeon
Director
Instituto de Cirugia Plastica S.C.
Huatquilucan
Estado de Mexico, Mexico

Barry DiBernardo, MD, FACS
Clinical Associate Professor, Plastic Surgery
Rutgers, New Jersey Medical School
Director New Jersey Plastic Surgery
Montclair, NJ, USA

Felmont F. Eaves III, MD, FACS
Professor of Surgery, Emory University
Medical Director, Emory Aesthetic Center
Medical Director, EAC Ambulatory Surgery Center
Atlanta, GA, USA
<table>
<thead>
<tr>
<th>Name</th>
<th>Title/Position</th>
<th>Institution/Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marco Ellis, MD</td>
<td>Director of Craniofacial Surgery</td>
<td>Northwestern Specialists in Plastic Surgery; parked as Adjunct Assistant Professor University of Illinois Chicago Medical Center Chicago, IL, USA</td>
</tr>
<tr>
<td>Dino Elyassnia, MD</td>
<td>Associate Plastic Surgeon</td>
<td>Marten Clinic of Plastic Surgery San Francisco, CA, USA</td>
</tr>
<tr>
<td>Julius Few Jr., MD</td>
<td>Director</td>
<td>The Few Institute for Aesthetic Plastic Surgery; Clinical Professor Plastic Surgery University of Chicago Pritzker School of Medicine Chicago, IL, USA</td>
</tr>
<tr>
<td>Osvaldo Ribeiro Saldanha Filho, MD</td>
<td>Professor of Plastic Surgery</td>
<td>Plastic Surgery Service Dr. Osvaldo Saldanha Sao Paulo, Brazil</td>
</tr>
<tr>
<td>Jack Fisher, MD</td>
<td>Associate Clinical Professor</td>
<td>Plastic Surgery Vanderbilt University Nashville, TN, USA</td>
</tr>
<tr>
<td>Nicholas A. Flugstad, MD</td>
<td>Flugstad Plastic Surgery</td>
<td>Bellevue, WA, USA</td>
</tr>
<tr>
<td>James D. Frame, MBBS, FRCS, FRCS(Plast)</td>
<td>Professor of Aesthetic Plastic Surgery</td>
<td>Anglia Ruskin University Chelmsford, UK</td>
</tr>
<tr>
<td>Jazmina M. Gonzalez, MD</td>
<td>Bitar Cosmetic Surgery Institute</td>
<td>Fairfax, VA, USA</td>
</tr>
<tr>
<td>Richard J. Greco, MD</td>
<td>CEO</td>
<td>The Georgia Institute For Plastic Surgery Savannah, GA, USA</td>
</tr>
<tr>
<td>Ronald P. Gruber, MD</td>
<td>Adjunct Associate Clinical Professor</td>
<td>Division of Plastic and Reconstructive Surgery Stanford University Stanford, CA Clinical Association Professor Division of Plastic and Reconstructive Surgery University of California San Francisco San Francisco, CA, USA</td>
</tr>
<tr>
<td>Bahman Guyuron, MD, FCVS</td>
<td>Editor in Chief, Aesthetic Plastic Surgery Journal Emeritus Professor of Plastic Surgery Case School of Medicine Cleveland, OH, USA</td>
<td></td>
</tr>
<tr>
<td>Joseph P. Hunstad, MD, FACS</td>
<td>Associate Consulting Professor</td>
<td>Division of Plastic Surgery The University of North Carolina at Chapel Hill; Private Practice Huntersville/Charlotte, NC, USA</td>
</tr>
<tr>
<td>Clyde H. Ishii, MD, FACS</td>
<td>Assistant Clinical Professor of Surgery</td>
<td>John A. Burns School of Medicine; Chief, Department of Plastic Surgery Shriner's Hospital Honolulu Unit Honolulu, HI, USA</td>
</tr>
<tr>
<td>Nicole J. Jarrett, MD</td>
<td>Department of Plastic Surgery</td>
<td>University of Pittsburgh Pittsburgh, PA, USA</td>
</tr>
<tr>
<td>Elizabeth B. Jelks, MD</td>
<td>Private Practice</td>
<td>New York, NY, USA</td>
</tr>
<tr>
<td>Glenn W. Jelks, MD</td>
<td>Associate Professor</td>
<td>Department of Ophthalmology Department of Plastic Surgery New York University School of Medicine New York, NY, USA</td>
</tr>
<tr>
<td>Mark Laurence Jewell, MD</td>
<td>Assistant Clinical Professor of Plastic Surgery</td>
<td>Oregon Health Science University Portland, OR, USA</td>
</tr>
<tr>
<td>David M. Kahn, MD</td>
<td>Clinical Associate Professor of Plastic Surgery</td>
<td>Department of Surgery Stanford University School of Medicine Stanford, CA, USA</td>
</tr>
<tr>
<td>Michael A. C. Kane, BS, MD</td>
<td>Attending Surgeon</td>
<td>Plastic Surgery Manhattan Eye, Ear, and Throat Hospital New York, NY, USA</td>
</tr>
<tr>
<td>David L. Kaufman, MD, FACS</td>
<td>Private Practice</td>
<td>Plastic Surgery Aesthetic Artistry Surgical and Medical Center Folsom, CA, USA</td>
</tr>
<tr>
<td>Jeffrey Kenkel, MD</td>
<td>Professor and Chairman</td>
<td>Department of Plastic Surgery UT Southwestern Medical Center Dallas, TX, USA</td>
</tr>
<tr>
<td>Kyung S. Koh, MD, PhD</td>
<td>Professor of Plastic Surgery</td>
<td>Asan Medical Center, University of Ulsan School of Medicine Seoul, South Korea</td>
</tr>
<tr>
<td>Tracy Leong, MD</td>
<td>Dermatologist</td>
<td>Rady Children’s Hospital - San Diego; Sharp Memorial Hospital; University California San Diego Medical Center San Diego; Private Practice, FACES+ Plastic Surgery, Skin and Laser Center La Jolla, CA, USA</td>
</tr>
<tr>
<td>Steven M. Levine, MD</td>
<td>Assistant Professor of Surgery (Plastic)</td>
<td>Hofstra Medical School, Northwell Health, New York, NY, USA</td>
</tr>
<tr>
<td>Michelle B. Locke, MBChB, MD</td>
<td>Senior Lecturer in Surgery</td>
<td>University of Auckland Faculty of Medicine and Health Sciences; South Auckland Clinical Campus Middlemore Hospital Auckland, New Zealand</td>
</tr>
<tr>
<td>Alyssa Lolofie</td>
<td>University of Utah</td>
<td>Salt Lake City, UT, USA</td>
</tr>
<tr>
<td>Timothy J. Marten, MD, FACS</td>
<td>Founder and Director</td>
<td>Marten Clinic of Plastic Surgery San Francisco, CA, USA</td>
</tr>
<tr>
<td>Bryan Mendelson, FRCSE, FRACS, FACS</td>
<td>The Centre for Facial Plastic Surgery</td>
<td>Toorak, Victoria, Australia</td>
</tr>
<tr>
<td>Constantino G. Mendieta, MD, FACS</td>
<td>Private Practice</td>
<td>Miami, FL, USA</td>
</tr>
<tr>
<td>Drew B. Metcalfe, MD</td>
<td>Division of Plastic and Reconstructive Surgery</td>
<td>Emory University Atlanta, GA, USA</td>
</tr>
<tr>
<td>Gabriele C. Miotto, MD</td>
<td>Emory School of Medicine</td>
<td>Atlanta, GA, USA</td>
</tr>
<tr>
<td>Foad Nahai, MD</td>
<td>Professor of Surgery</td>
<td>Division of Plastic and Reconstructive Surgery Department of Surgery Emory University School of Medicine Emory Aesthetic Center at Paces Atlanta, Georgia, USA</td>
</tr>
<tr>
<td>Suzan Obagi, MD</td>
<td>Associate Professor of Dermatology</td>
<td>University of Pittsburgh; Associate Professor of Plastic Surgery Plastic Surgery University of Pittsburgh Pittsburgh, PA, USA</td>
</tr>
</tbody>
</table>
Sabina Aparecida Alvarez de Paiva, MD
Resident of Plastic Surgery
Plastic Surgery Service Dr. Ewaldo Bolivar de Souza Pinto
São Paulo, Brazil

Galen Perdikis, MD
Assistant Professor of Surgery
Division of Plastic Surgery
Emory University School of Medicine
Atlanta, GA, USA

Jason Posner, MD, FACS
Private Practice
Boca Raton, FL, USA

Dirk F. Richter, MD, PhD
Clinical Professor of Plastic Surgery
University of Bonn
Director and Chief
Dreifaltigkeits-Hospital
Wesseling, Germany

Thomas L. Roberts III, FACS
Plastic Surgery Center of the Carolinas
Spartanburg, SC, USA

Jocelyn Celeste Ledezma Rodriguez, MD
Private Practice
Guadalajara, Jalisco, Mexico

Rod J. Rohrich, MD
Clinical Professor and Founding Chair
Department of Plastic Surgery
Distinguished Teaching Professor
University of Texas Southwestern Medical Center
Founding Partner
Dallas Plastic Surgery Institute
Dallas, TX, USA

E. Victor Ross, MD
Director of Laser and Cosmetic Dermatology
Scripps Clinic
San Diego, CA, USA

J. Peter Rubin, MD, FACS
Chief
Plastic and Reconstructive Surgery
University of Pittsburgh Medical Center;
Associate Professor
Department of Surgery
University of Pittsburgh
Pittsburgh, PA, USA

Ahmad N. Saad, MD
Private Practice
FACES+ Plastic Surgery
Skin and Laser Center
La Jolla, CA, USA

Alesia P. Saboeiro, MD
Attending Physician
Private Practice
New York, NY, USA

Alessianna Bonnetto Saldanha, MD
Plastic Surgery Service Dr. Osvaldo Saldanha
São Paulo, Brazil

Osvaldo Saldanha, MD, PhD
Director of Plastic Surgery Service Dr. Osvaldo Saldanha;
Professor of Plastic Surgery
Universidade Metropolitana de Santos - UNIMES
São Paulo, Brazil

Renato Saltz, MD, FACS
Saltz Plastic Surgery
President
International Society of Aesthetic Plastic Surgery
Adjunct Professor of Surgery
University of Utah
Past-President, American Society for Aesthetic Plastic Surgery
Salt Lake City and Park City, UT, USA

Paulo Rodamian Sanjuan MD
Chief Resident of Plastic Surgery
Plastic Surgery Service Dr. Ewaldo Bolivar de Souza Pinto
São Paulo, Brazil

Nina Schwaiger, MD
Senior Specialist in Plastic and Aesthetic Surgery
Department of Plastic Surgery
Dreifaltigkeits-Hospital Wesseling
Wesseling, Germany

Douglas S. Steinbrech, MD, FACS
Gotham Plastic Surgery
New York, NY, USA

Phillip J. Stephan, MD
Clinical Faculty
Plastic Surgery
UT Southwestern Medical School;
Plastic Surgeon
Texoma Plastic Surgery
Wichita Falls, TX, USA

David Gonzalez Sosa, MD
Plastic and Reconstructive Surgery
Hospital Quirónsalud Torrevieja
Alicante, Spain

James M. Stuzin, MD
Associate Professor of Surgery
(Plastic) Voluntary
University of Miami Leonard M. Miller School of Medicine
Miami, FL, USA

Daniel Suissa, MD, MSc
Clinical Instructor
Section of Plastic and Reconstructive Surgery
Yale University
New Haven, CT, USA

Charles H. Thorne, MD
Associate Professor of Plastic Surgery
Department of Plastic Surgery
NYU School of Medicine
New York, NY, USA

Ali Totonchi, MD
Assistant Professor
Plastic Surgery
Case Western Reserve University;
Medical Director Craniofacial Deformity Clinic
Plastic Surgery
MetroHealth Medical Center
Cleveland, OH, USA

Jonathan W. Toy, MD, FRCSC
Program Director, Plastic Surgery Residency
Program Assistant Clinical Professor
University of Alberta
Edmonton, Alberta, Canada

Matthew J. Trovato, MD
Dallas Plastic Surgery Institute
Dallas, TX, USA

Simeon H. Wall Jr., MD, FACS
Director
The Wall Center for Plastic Surgery;
Assistant Clinical Professor
Plastic Surgery
LSU Health Sciences Center at Shreveport
Shreveport, LA, USA

Joshua T. Waltzman, MD, MBA
Private Practice
Waltzman Plastic and Reconstructive Surgery
Long Beach, CA, USA

Richard J. Warren, MD, FRCSC
Clinical Professor
Division of Plastic Surgery
University of British Columbia
Vancouver, British Columbia, Canada

Edmund Weisberg, MS, MBE
University of Pennsylvania
Philadelphia, PA, USA

Scott Woehrle, MS BS
Physician Assistant
Department of Plastic Surgery
Joseph Capella Plastic Surgery
Ramsey, NJ, USA

Chin-Ho Wong, MBBS, MRCS, MMed(Surg),
FAMS(Plast Surg)
W Aesthetic Plastic Surgery
Mt Elizabeth Novena Specialist Center
Singapore

Alan Yan, MD
Former Fellow
Adult Reconstructive and Aesthetic
Craniofacial Surgery
Division of Plastic and Reconstructive Surgery
Massachusetts General Hospital
Boston, MA, USA
Michael J. Yaremchuk, MD  
Chief of Craniofacial Surgery  
Massachusetts General Hospital;  
Clinical Professor of Surgery  
Harvard Medical School;  
Program Director  
Harvard Plastic Surgery Residency Program  
Boston, MA, USA

James E. Zins, MD  
Chairman  
Department of Plastic Surgery  
Dermatology and Plastic Surgery Institute  
Cleveland Clinic  
Cleveland, OH, USA

VOLUME THREE

Neta Adler, MD  
Senior Surgeon  
Department of Plastic and Reconstructive Surgery  
Hadassah University Hospital  
Jerusalem, Israel

Ahmed M. Affifi, MD  
Assistant Professor of Plastic Surgery  
Department of Surgery  
University of Wisconsin  
Madison, WI, USA;  
Associate Professor  
Department of Plastic Surgery  
Cairo University  
Cairo, Egypt

Marta Alvarado, DDS, MS  
Department of Orthodontics  
Facultad de Odontología  
Universidad de San Carlos de Guatemala  
Guatemala

Eric Arnaud, MD  
Pediatric Neurosurgeon and Co-Director  
Unité de Chirurgie Craniofaciale  
Hôpital Necker Enfants Malades  
Paris, France

Stephen B. Baker, MD, DDS  
Associate Professor and Program Director  
Co-Director Inova Hospital for Children  
Craniofacial Clinic  
Department of Plastic Surgery  
Georgetown University Hospital  
Georgetown, WA, USA

Scott P. Bartlett, MD  
Professor of Surgery  
Surgery  
University of Pennsylvania;  
Chief Division of Plastic Surgery  
Children’s Hospital of Philadelphia  
Philadelphia, PA, USA

Bruce S. Bauer, MD  
Chief  
Division of Plastic Surgery  
NorthShore University HealthSystem  
Highland Park;  
Clinical Professor of Surgery  
Department of Surgery  
University of Chicago Pritzker School of Medicine  
Chicago, IL, USA

Adriane L. Baylis, PhD  
Speech Scientist  
Section of Plastic and Reconstructive Surgery  
Nationwide Children’s Hospital  
Columbus, OH, USA

Mike Bentz, MD, FAAP, FACS  
Interim Chairman  
Department of Surgery  
University of Wisconsin;  
Chairman Division of Plastic Surgery  
Department of Surgery  
University of Wisconsin  
Madison, WI, USA

Craig Birgfeld, MD, FACS  
Associate Professor, Pediatric Plastic and Craniofacial Surgery  
Seattle Children’s Hospital  
Seattle, WA, USA

William R. Boysen, MD  
Resident Physician, Urology  
University of Chicago Medicine  
Chicago, IL, USA

James P. Bradley, MD  
Professor and Chief  
Section of Plastic and Reconstructive Surgery  
Temple University  
Philadelphia, PA, USA

Edward P. Buchanan, MD  
Division of Plastic Surgery  
Baylor College of Medicine  
Houston, TX, USA

Michael R. Bykowski, MD, MS  
Plastic Surgery Resident  
Plastic Surgery  
University of Pittsburgh Medical Center  
Pittsburgh, PA, USA

Edward J. Caterson, MD, PhD  
Director of Craniofacial Surgery  
Division of Plastic Surgery  
Brigham and Women’s Hospital  
Boston, MA, USA

Rodney K. Chan, MD  
Chief Plastic and Reconstructive Surgery  
Clinical Division and Burn Center  
United States Army Institute of Surgical Research  
Joint Base San Antonio, TX, USA

Edward I. Chang, MD  
Assistant Professor  
Department of Plastic Surgery  
The University of Texas M. D. Anderson Cancer Center  
Houston, TX, USA

Constance M. Chen, MD, MPH  
Director of Microsurgery  
Plastic and Reconstructive Surgery  
New York Eye and Ear Infirmary of Mt Sinai;  
Clinical Assistant Professor  
Plastic and Reconstructive Surgery  
Weil Medical College of Cornell University;  
Clinical Assistant Professor  
Plastic and Reconstructive Surgery  
Tulane University School of Medicine  
New York, NY, USA

Yu-Ray Chen, MD  
Professor of Surgery  
Plastic and Reconstructive Surgery  
Chang Gung Memorial Hospital  
Taoyuan City, Taiwan

Philip Kuo-Ting Chen, MD  
Professor  
Craniofacial Center  
Chang Gung Memorial Hospital  
Taoyuan City, Taiwan

Ming-Huei Cheng, MD, MBA  
Professor  
Division of Reconstructive Microsurgery  
Department of Plastic and Reconstructive Surgery  
Chang Gung Memorial Hospital  
Taoyuan City, Taiwan

Gerson R. Chinchilla, DDS MS  
Director  
Department of Orthodontics  
Facultad de Odontología  
Universidad de San Carlos de Guatemala  
Guatemala

Peter G. Cordeiro, MD  
Chief  
Plastic and Reconstructive Surgery  
Memorial Sloan Kettering Cancer Center;  
Professor of Surgery  
Surgery  
Weil Medical College of Cornell University  
New York, NY, USA

Alberto Córdova-Aguilar, MD, MPH  
Attending Plastic Surgeon  
Surgery  
Faculty of Medicine Ricardo Palma University  
Lima, Peru

Edward H. Davidson, MA(Cantab), MBBS  
Resident Plastic Surgeon  
Department of Plastic Surgery  
University of Pittsburgh  
Pittsburgh, PA, USA
List of Contributors

Sara R. Dickie, MD
Clinician Educator
Surgery
University of Chicago Hospital Pritzker School of Medicine;
Attending Surgeon
Section of Plastic and Reconstructive Surgery
NorthShore University HealthSystem
Northbrook, IL, USA

Risal S. Djohan, MD
Microsurgery Fellowship Program Director
Plastic Surgery
Cleveland Clinic;
Surgery ASC Quality Improvement Officer
Plastic Surgery
Cleveland Clinic
Cleveland, OH, USA

Amir H. Doraftshar, MBChB, FACS, FAAP
Associate Professor
Plastic and Reconstructive Surgery
Johns Hopkins Medical Institute;
Assistant Professor
Plastic Surgery
R Adams Cowley Shock Trauma Center
Baltimore, MD, USA

Jeffrey A. Fearon, MD
Director
The Craniofacial Center
Dallas, TX, USA

Alexander L. Figueroa, DMD
Craniofacial Orthodontist
Rush Craniofacial Center
Rush University Medical Center
Chicago, IL, USA

Alvaro A. Figueroa, DDS, MS
Co-Director
Rush Craniofacial Center
Rush University Medical Center
Chicago, IL, USA

David M. Fisher, MB, BCh, FRCS, FACS
Medical Director Cleft Lip and Palate Program
Plastic Surgery
Hospital for Sick Children;
Associate Professor
Surgery
University of Toronto
Toronto, Ontario, Canada

Roberto L. Flores, MD
Associate Professor of Plastic Surgery
Director of Cleft Lip and Palate
Hansjörg Wyas Department of Plastic Surgery
NYU Langone Medical Center
New York, NY, USA

Andrew Foreman, B. Physio, BMBS(Hons), PhD, FRACS
Consultant Surgeon, Department of Otolaryngology - Head and Neck Surgery
University of Adelaide,
Royal Adelaide Hospital,
Adelaide, SA, Australia

Patrick A. Gerety, MD
Assistant Professor of Surgery
Division of Plastic and Reconstructive Surgery
Indiana University and Riley Hospital for Children
Philadelphia, PA, USA

Jesse A. Goldstein, MD
Chief Resident
Department of Plastic Surgery
Georgetown University Hospital
Washington, DC, USA

Arum K. Gosain, MD
Chief
Division of Plastic Surgery
Ann and Robert H. Lurie Children’s Hospital of Chicago
Chicago, IL, USA

Lawrence J. Gottlieb, MD
Professor of Surgery
Department of Surgery
Section of Plastic and Reconstructive Surgery
University of Chicago
Chicago, IL, USA

Arin K. Greene, MD, MMS
Department of Plastic and Oral Surgery
Boston Children’s Hospital;
Associate Professor of Surgery
Harvard Medical School
Boston, MA, USA

Patrick J. Guillane, MD, FRCS
Wharton Chair in Head and Neck Surgery
Professor of Surgery, Department of Otolaryngology - Head and Neck Surgery
University of Toronto
Toronto, Ontario, Canada

Mohan S. Gundeti, MB, MCh, FEBU, FRCS(Urol), FEAPU
Associate Professor of Urology in Surgery and Pediatrics, Director Pediatric Urology, Director Centre for Pediatric Robotics and Minimal Invasive Surgery
University of Chicago and Pritzker Medical School Comer Children’s Hospital
Chicago, IL, USA

Eyal Gur, MD
Professor of Surgery, Chief
Department of Plastic and Reconstructive Surgery
The Tel Aviv Sourasky Medical Center
Tel Aviv, Israel

Bahman Guyuron, MD, FCVS
Editor in Chief, Aesthetic Plastic Surgery Journal;
Emeritus Professor of Plastic Surgery
Case School of Medicine
Cleveland, OH, USA

Matthew M. Hanasono, MD
Associate Professor
Department of Plastic Surgery
The University of Texas MD Anderson Cancer Center
Houston, TX, USA

Toshinobu Harada, PhD
Professor in Engineering
Department of Systems Engineering
Faculty of Systems Engineering
Wakayama University
Wakayama, Japan

Jill A. Helms, DDS, PhD
Professor
Surgery
Stanford University
Stanford, CA, USA

David L. Hirsch, MD, DDS
Director of Oral Oncology and Reconstruction
Lenox Hill Hospital/Northwell Health
New York, NY, USA

Jung-Ju Huang, MD
Associate Professor
Division of Microsurgery
Plastic and Reconstructive Surgery
Chang Gung Memorial Hospital
Taoyuan, Taiwan

William Y. Hoffman, MD
Professor and Chief
Division of Plastic and Reconstructive Surgery
UCSF
San Francisco, CA, USA

Larry H. Hollier Jr., MD
Division of Plastic Surgery
Baylor College of Medicine
Houston, TX, USA

Richard A. Hopper, MD, MS
Chief
Division of Craniofacial Plastic Surgery
Seattle Children’s Hospital;
Surgical Director
Craniofacial Center
Seattle Children’s Hospital;
Associate Professor
Department of Surgery
University of Washington
Seattle, WA, USA

Gazi Hussain, MBBS, FRACS
Clinical Senior Lecturer
Macquarie University
Sydney, Australia

Oksana Jackson, MD
Assistant Professor
Plastic Surgery
Perelman School of Medicine at the University of Pennsylvania;
Assistant Professor
Plastic Surgery
The Children’s Hospital of Philadelphia
Philadelphia, PA, USA
Syriel James, MD
Clinic Marcel Sembat
Boulogne-Billancourt
Paris, France

Leila Jazayeri, MD
Microsurgery Fellow
Plastic and Reconstructive Surgery
Memorial Sloan Kettering Cancer Center
New York, NY, USA

Sahil Kapur, MD
Assistant Professor
Department of Plastic Surgery
University of Texas - MD Anderson Cancer Center
Houston, TX, USA

Henry K. Kawamoto Jr., MD, DDS
Clinical Professor
Surgery Division of Plastic Surgery
UCLA
Los Angeles, CA, USA

David Y. Khechoyan, MD
Division of Plastic Surgery
Baylor College of Medicine
Houston, TX, USA

Richard E. Kirschner, MD
Section Chief
Plastic and Reconstructive Surgery
Nationwide Children’s Hospital;
Senior Vice Chair
Plastic Surgery
The Ohio State University Medical College
Columbus, OH, USA

John C. Koshy, MD
Division of Plastic Surgery
Baylor College of Medicine
Houston, TX, USA

Michael C. Large, MD
Urologic Oncologist
Urology of Indiana
Greenwood, IN, USA

Edward I. Lee, MD
Division of Plastic Surgery
Baylor College of Medicine
Houston, TX, USA

Jamie R. Levine, MD
Chief of Microsurgery
Associate Professor
Plastic Surgery
NYU Langone Medical Center
New York, NY, USA

Jingtao Li, DDS, PhD
Consultant Surgeon
Oral and Maxillofacial Surgery
West China Hospital of Stomatology
Chengdu, Sichuan, People’s Republic of China

Lawrence Lin, MD
Division of Plastic Surgery
Baylor College of Medicine
Houston, TX, USA

Joseph E. Losee, MD
Ross H. Musgrave Professor of Pediatric Plastic Surgery
Department of Plastic Surgery
University of Pittsburgh Medical Center;
Chief, Division of Pediatric Plastic Surgery
Children’s Hospital of Pittsburgh
Pittsburgh, PA, USA

David W. Low, MD
Professor of Surgery
Division of Plastic Surgery
Perelman School of Medicine at the University of Pennsylvania;
Clinical Associate
Department of Surgery
Children’s Hospital of Philadelphia
Philadelphia, PA, USA

Ralph T. Manktelow, MD, FRCSC
Professor of Surgery,
The University of Toronto,
Toronto, Ontario, Canada

Paul N. Manson, MD
Distinguished Service Professor
Plastic Surgery
Johns Hopkins University
Baltimore, MD, USA

David W. Mathes, MD
Professor and Chief of the Division of Plastic and Reconstructive Surgery
Surgery Division of Plastic and Reconstructive Surgery
University of Colorado
Aurora, CO, USA

Frederick J. Menick, MD
Private Practitioner
Tucson, AZ, USA

Fernando Molina, MD
Director
Craniofacial Anomalies Foundation A.C.
Mexico City;
Professor of Plastic Reconstructive and Aesthetic Surgery
Medical School
Universidad La Salle
Mexico City, Distrito Federal, Mexico

Laura A. Monson, MD
Division of Plastic Surgery
Baylor College of Medicine
Houston, TX, USA

Reid V. Mueller, MD
Associate Professor
Plastic Surgery
Oregon Health and Science University
Portland, OR, USA

John B. Mulliken, MD
Professor
Department of Plastic and Oral Surgery
Boston Children’s Hospital
Harvard Medical School
Boston, MA, USA

Gerhard S. Mundinger, MD
Assistant Professor
Craniofacial, Plastic, and Reconstructive Surgery
Louisiana State University Health Sciences Center
Children’s Hospital of New Orleans
New Orleans, LA, USA

Blake D. Murphy, BSc, PhD, MD
Craniofacial Fellow
Plastic Surgery
Nicklaus Children’s Hospital
Miami, FL, USA

Peter C. Neligan, MB, FRCs(l), FRCSC, FACS
Professor of Surgery
Department of Surgery, Division of Plastic Surgery
University of Washington
Seattle, WA, USA

M. Samuel Noordhoff, MD, FACS
Emeritus Professor in Surgery
Chang Gung University
Taoyuan City, Taiwan

Giovanna Paternoster, MD
Unité de chirurgie crânio-faciale du departement de neurochirurgie
Hôpital Necker Enfants Malades
Paris, France

Jason Pomerantz, MD
Assistant Professor
Surgery
University of California San Francisco;
Surgical Director
Craniofacial Center
University of California San Francisco
San Francisco, CA, USA

Julian J. Pribaz, MD
Professor of Surgery
University of South Florida, Morsani College of Medicine
Tampa General Hospital
Tampa, FL, USA

Chad A. Purnell, MD
Division of Plastic Surgery
Lurie Children’s Hospital of Northwestern Feinberg School of Medicine
Chicago, IL, USA

Russell R. Reid, MD, PhD
Associate Professor
Surgery/Section of Plastic and Reconstructive Surgery
University of Chicago Medicine
Chicago, IL, USA

Eduardo D. Rodriguez, MD, DDS
Helen L. Kimmel Professor of Reconstructive Plastic Surgery
Chair, Hansjörg Wyss Department of Plastic Surgery
NYU School of Medicine
NYU Langone Medical Center
New York, NY, USA
Craig Rowin, MD  
Craniofacial Fellow  
Plastic Surgery  
Nicklaus Children’s Hospital  
Miami, FL, USA

Ruston J. Sanchez, MD  
Plastic and Reconstructive Surgery Resident  
University of Wisconsin  
Madison, WI, USA

Lindsay A. Schuster, DMD, MS  
Director Cleft-Craniofacial Orthodontics  
Pediatric Plastic Surgery  
Children’s Hospital of Pittsburgh of UPMC;  
Clinical Assistant Professor of Plastic Surgery  
Department of Plastic Surgery  
University of Pittsburgh School of Medicine  
Pittsburgh, PA, USA

Jeremiah Un Chang See, MD  
Plastic Surgeon  
Department of Plastic and Reconstructive Surgery  
Penang General Hospital  
Georgetown, Penang, Malaysia

Pradip R. Shetye, DDS, BDS, MDS  
Assistant Professor (Orthodontics)  
Hansjörg Wyss Department of Plastic Surgery  
NYU Langone Medical Center  
New York, NY, USA

Roman Skoracki, MD  
Plastic Surgery  
The Ohio State University  
Columbus, OH, USA

Mark B. Slidell, MD, MPH  
Assistant Professor of Surgery  
Department of Surgery  
Section of Pediatric Surgery  
University of Chicago Medicine Biological Sciences  
Chicago, IL, USA

Michael Sosin, MD  
Research Fellow  
Department of Plastic Surgery Institute of Reconstructive Plastic Surgery  
NYU Langone Medical Center  
New York, NY, USA;  
Research Fellow  
Division of Plastic Reconstructive and Maxillofacial Surgery  
R Adams Cowley Shock Trauma Center  
University of Maryland Medical Center  
Baltimore, MD, USA;  
Resident  
Department of Surgery  
Medstar Georgetown University Hospital  
Washington, DC, USA

Youssef Tahiri, MD, MSc, FRCSC, FAAP, FACS  
Associate Professor  
Pediatric Plastic & Craniofacial Surgery  
Cedars Sinai Medical Center  
Los Angeles, CA, USA

Peter J. Taub, MD  
Professor  
Surgery Pediatrics Dentistry and Medical Education  
Surgery Division of Plastic and Reconstructive Surgery  
Icahn School of Medicine at Mount Sinai  
New York, NY, USA

Jesse A. Taylor, MD  
Mary Downs Endowed Chair of Pediatric Craniofacial Treatment and Research;  
Director, Penn Craniofacial Fellowship;  
Co-Director, CHOP Cleft Team  
Plastic, Reconstructive, and Craniofacial Surgery  
The University of Pennsylvania and Children’s Hospital of Philadelphia  
Philadelphia, PA, USA

Kathryn S. Torok, MD  
Assistant Professor  
Pediatric Rheumatology  
University of Pittsburgh  
Pittsburgh, PA, USA

Ali Totonchi, MD  
Assistant Professor  
Plastic Surgery  
Case Western Reserve University;  
Medical Director Craniofacial Deformity Clinic  
Plastic Surgery  
MetroHealth Medical Center  
Cleveland, OH, USA

Kris Wilson, MD  
Division of Plastic Surgery  
Baylor College of Medicine  
Houston, TX, USA

S. Anthony Wolfe, MD  
Plastic Surgery  
Miami Children’s Hospital  
Miami, FL, USA

Akira Yamada, MD, PhD  
Professor of Plastic Surgery  
World Craniofacial Foundation  
Dallas, TX, USA;  
Clinical Assistant Professor  
Plastic Surgery  
Case Western Reserve University  
Cleveland, OH, USA

Peirong Yu, MD  
Professor  
Plastic Surgery  
M. D. Anderson Cancer Center;  
Adjunct Professor  
Plastic Surgery  
Baylor College of Medicine  
Houston, TX, USA

Ronald M. Zuker, MD, FRCSC, FACS, FRCSEd(Hon)  
Professor of Surgery  
Department of Surgery  
University of Toronto;  
Staff Plastic and Reconstructive Surgeon  
Department of Surgery  
SickKids Hospital  
Toronto, Ontario, Canada

Christopher E. Attinger, MD  
Professor, Interim Chairman  
Department of Plastic Surgery  
Center for Wound Healing  
Medstar Georgetown University Hospital  
Washington, DC, USA

Lorenzo Borghese, MD  
Plastic Surgeon  
Chief of International Missions  
Ospedale Pediatrico Bambino Gesù  
Rome, Italy

Charles E. Butler, MD, FACS  
Professor and Chairman  
Department of Plastic Surgery  
Charles B. Barker Endowed Chair in Surgery  
The University of Texas M. D. Anderson Cancer Center  
Houston, TX, USA

David W. Chang, MD  
Professor of Surgery  
University of Chicago  
Chicago, IL, USA

Karel Claes, MD  
Department of Plastic and Reconstructive Surgery  
Ghent University Hospital  
Ghent, Belgium

Mark W. Clemens II, MD, FACS  
Associate Professor  
Plastic Surgery  
MD Anderson Cancer Center,  
Houston, TX, USA

Shannon M. Colohan, MD, MSc  
Assistant Professor of Surgery  
University of Washington  
Seattle, WA, USA

Peter G. Cordeiro, MD  
Chief  
Plastic and Reconstructive Surgery  
Memorial Sloan Kettering Cancer Center  
New York, NY, USA

Salvatore D’Arpa, MD, PhD  
Department of Plastic and Reconstructive Surgery  
Ghent University Hospital  
Ghent, Belgium
Michael V. DeFazio, MD  
Department Plastic Surgery  
MedStar Georgetown University Hospital  
Washington, DC, USA

A. Lee Dellon, MD, PhD  
Professor of Plastic Surgery  
Professor of Neurosurgery  
Johns Hopkins University  
Baltimore, MD, USA

Sara R. Dickie, MD  
Clinical Associate of Surgery  
University of Chicago Hospitals  
Pritzker School of Medicine  
Chicago, IL, USA

Ivica Ducic, MD, PhD  
Clinical Professor of Surgery  
GWU Washington Nerve Institute  
McLean, VA, USA

Gregory A. Dumanian, MD  
Stuteville Professor of Surgery  
Division of Plastic Surgery  
Northwestern Feinberg School of Medicine  
Chicago, IL, USA

John M. Felder III, MD  
Fellow in Hand Surgery  
Plastic Surgery  
Washington University in Saint Louis  
St. Louis, MO, USA

Goetz A. Giessler, MD, PhD  
Clinical Professor of Surgery  
Department of Urology  
Ghent University Hospital  
Ghent, Belgium

Kevin D. Han, MD  
Department of Plastic Surgery  
MedStar Georgetown University Hospital  
Washington, DC, USA

Otway Louie, MD  
Department of Urology  
Ghent University Hospital  
Ghent, Belgium

Joon Pio Hong, MD, PhD, MMM  
Professor of Plastic Surgery  
Asan Medical Center, University of Ulsan  
Seoul, South Korea

Michael A. Howard, MD  
Clinical Assistant Professor of Surgery  
Plastic Surgery  
NorthShore University HealthSystem/University of Chicago  
Chicago, IL, USA

Jeffrey E. Janis, MD, FACS  
Professor of Plastic Surgery, Neurosurgery, Neurology, and Surgery;  
Executive Vice Chairman, Department of Plastic Surgery;  
Chief of Plastic Surgery, University Hospitals  
Ohio State University Wexner Medical Center  
Columbus, OH, USA

Leila Jazayeri, MD  
Microsurgery Fellow  
Plastic and Reconstructive Surgery  
Memorial Sloan Kettering Cancer Center  
New York, NY, USA

Grant M. Kleiber, MD  
Assistant Professor of Surgery  
Division of Plastic and Reconstructive Surgery  
Washington University School of Medicine  
St. Louis, MO, USA

Stephen J. Kovach III, MD  
Assistant Professor  
Division of Plastic Surgery  
University of Pennsylvania  
Philadelphia, PA, USA

Robert Kwon, MD  
Southwest Hand and Microsurgery  
3108 Midway Road, Suite 103  
Plano, TX, USA

Raphael C. Lee, MS, MD, ScD, FACS, FAIMBE  
Paul and Allene Russell Professor  
Plastic Surgery, Dermatology, Anatomy and Organismal Biology, Molecular Medicine  
University of Chicago  
Chicago, IL, USA

L. Scott Levin, MD, FACs  
Chairman of Orthopedic Surgery  
Department of Orthopaedic Surgery  
University of Pennsylvania School of Medicine  
Philadelphia, PA, USA

Nicolas Lumen, MD, PhD  
Head of Clinic Urology  
Ghent University Hospital  
Ghent, Belgium

Alessandro Masellis, MD  
Plastic Surgeon  
Euro-Mediterranean Council for Burns and Fire Disasters  
Palermo, Italy

Michele Masellis, MD  
Former Chief of Department of Plastic and Reconstructive Surgery and Burn Therapy  
Department of Plastic and Reconstructive Surgery and Burn Therapy - ARNAS Ospedale Civico e Benfratelli  
Palermo, Italy

Stephen M. Milner, MB BS, BDS  
Professor of Plastic Surgery  
Surgery  
Johns Hopkins School of Medicine  
Baltimore, MD, USA

Arash Momeni, MD  
Fellow, Reconstructive Microsurgery  
Division of Plastic Surgery  
University of Pennsylvania Health System  
Philadelphia, PA, USA

Stan Monstrey, MD, PhD  
Department of Plastic and Reconstructive Surgery  
Ghent University Hospital  
Ghent, Belgium

Venkateshwaran N, MBBS, MS, DNB, MCh, MRCS(Intercollegiate)  
Consultant Plastic Surgeon  
Jupiter Hospital  
Thane, India

Rajiv P. Parikh, MD, MPHS  
Resident Physician  
Department of Surgery, Division of Plastic and Reconstructive Surgery  
Washington University School of Medicine  
St. Louis, MO, USA

Mônica Sarto Piccolo, MD, MSc, PhD  
Director  
Pronto Socorro para Queimaduras  
Goiânia, Goiás, Brazil

Nelson Sarto Piccolo, MD  
Chief  
Division of Plastic Surgery  
Pronto Socorro para Queimaduras  
Goiânia, Goiás, Brazil

Maria Thereza Sarto Piccolo, MD, PhD  
Scientific Director  
Pronto Socorro para Queimaduras  
Goiânia, Goiás, Brazil

Vinita Puri, MS, MCh  
Professor and Head  
Department of Plastic, Reconstructive Surgery and Burns  
Seth G S Medical College and KEM Hospital  
Mumbai, Maharashtra, India

Andrea L. Pusic, MD, MHS, FACS  
Associate Professor  
Plastic and Reconstructive Surgery  
Memorial Sloan Kettering Cancer Center  
New York, NY, USA
Vinay Rawlani, MD  
Division of Plastic Surgery  
Northwestern Feinberg School of Medicine  
Chicago, IL, USA

Juan L. Rendon, MD, PhD  
Clinical Instructor Housestaff  
Department of Plastic Surgery  
The Ohio State University Wexner Medical Center  
Columbus, OH, USA

Michelle C. Roughton, MD  
Assistant Professor  
Division of Plastic and Reconstructive Surgery  
University of North Carolina at Chapel Hill  
Chapel Hill, NC, USA

Hakim K. Said, MD, FACS  
Associate Professor  
Division of Plastic Surgery  
University of Washington  
Seattle, WA, USA

Michel Saint-Cyr, MD, FRSC(C)  
Professor  
Plastic Surgery  
Mayo Clinic  
Rochester, MN, USA

Michael Sauerbier, MD, PhD  
Professor, Chair  
Department for Plastic, Hand, and Reconstructive Surgery  
Academic Hospital Goethe University Frankfurt am Main  
Frankfurt am Main, Germany

Loren S. Schechter, MD  
Associate Professor and Chief  
Division of Plastic Surgery  
Chicago Medical School  
Morton Grove, IL, USA

David H. Song, MD, MBA, FACS  
Regional Chief, MedStar Health  
Plastic and Reconstructive Surgery  
Professor and Chairman  
Department of Plastic Surgery  
Georgetown University School of Medicine  
Washington, DC, USA

Yoo Joon Sur, MD, PhD  
Associate Professor  
Department of Orthopedic Surgery  
The Catholic University of Korea, College of Medicine  
Seoul, Korea

Chad M. Teven, MD  
Resident  
Section of Plastic and Reconstructive Surgery  
University of Chicago  
Chicago, IL, USA

Robert Cohen MD, FACS  
Medical Director  
Plastic Surgery  
Scottsdale Center for Plastic Surgery  
Paradise Valley, AZ and;  
Santa Monica, CA, USA

Amy S. Colwell, MD  
Associate Professor  
Harvard Medical School  
Massachusetts General Hospital  
Boston, MA, USA

Edward H. Davidson, MA(Cantab), MB, BS  
Resident Plastic Surgeon  
Department of Plastic Surgery  
University of Pittsburgh Medical Center  
Pittsburgh, PA, USA

Emmanuel Delay, MD, PhD  
Unité de Chirurgie Plastique et Reconstructrice  
Centre Léon Bérard  
Lyon, France

Francesco M. Egro, MB ChB, MSc, MRCS  
Department of Plastic Surgery  
University of Pittsburgh Medical Center  
Pittsburgh, PA, USA

Neil A. Fine, MD  
President  
Northwestern Specialists in Plastic Surgery;  
Associate Professor (Clinical) Surgery/Plastics  
Northwestern University Feinberg School of Medicine  
Chicago, IL, USA

Jaime Flores, MD  
Plastic and Reconstructive Microvascular Surgeon  
Miami, FL, USA

Joshua Fosnot, MD  
Assistant Professor of Surgery  
Division of Plastic Surgery  
The Perelman School of Medicine  
University of Pennsylvania Health System  
Philadelphia, PA, USA

Allen Gabriel, MD  
Clinical Associate Professor  
Department of Plastic Surgery  
Loma Linda University Medical Center  
Loma Linda, CA, USA

Michael S. Gart, MD  
Resident Physician  
Division of Plastic Surgery  
Northwestern University Feinberg School of Medicine  
Chicago, IL, USA

Matthew D. Goodwin, MD  
Plastic Surgeon  
Plastic Reconstructive and Cosmetic Surgery  
Boca Raton Regional Hospital  
Boca Raton, FL, USA

VOLUME FIVE

Jamil Ahmad, MD, FRCSC  
Director of Research and Education  
The Plastic Surgery Clinic  
Mississauga, Ontario, Canada;  
Assistant Professor of Surgery  
University of Toronto  
Toronto, Ontario, Canada

Robert J. Allen Sr., MD  
Clinical Professor of Plastic Surgery  
Department of Plastic Surgery  
New York University Medical Center  
Charleston, NC, USA

Ryan E. Austin, MD, FRCSC  
Plastic Surgeon  
The Plastic Surgery Clinic  
Mississauga, ON, Canada

Brett Beber, BA, MD, FRCSC  
Plastic and Reconstructive Surgeon  
Lecturer, Department of Surgery  
University of Toronto  
Toronto, Ontario, Canada

Philip N. Blondeel, MD  
Professor of Plastic Surgery  
Department of Plastic Surgery  
University Hospital Ghent  
Ghent, Belgium

Benjamin J. Brown, MD  
Gulf Coast Plastic Surgery  
Pensacola, FL, USA

Mitchell H. Brown, MD, MEd, FRCSC  
Plastic and Reconstructive Surgeon  
Associate Professor, Department of Surgery  
University of Toronto  
Toronto, Ontario, Canada

M. Bradley Calobrace, MD, FACS  
Plastic Surgeon  
Calobrace and Mizuguchi Plastic Surgery Center  
Departments of Plastic Surgery, Divisions of Plastic Surgery  
Clinical Faculty, University of Louisville and University of Kentucky  
Louisville, KY, USA

Grant W. Carlson, MD  
Wadley R. Glenn Professor of Surgery  
Emory University  
Atlanta, GA, USA

Bernard W. Chang, MD  
Chief of Plastic and Reconstructive Surgery  
Mercy Medical Center  
Baltimore, MD, USA

Mark W. Clemens II, MD, FACS  
Assistant Professor Plastic Surgery  
M. D. Anderson Cancer Center  
Houston, TX, USA
Samia Guerid, MD
Cabinet
50 rue de la République
Lyon, France

Moustapha Hamdi, MD, PhD
Professor of Plastic and Reconstructive Surgery
Brussels University Hospital
Vrij Universitaire Brussels
Brussels, Belgium

Alexandra M. Hart, MD
Emory Division of Plastic and Reconstructive Surgery
Emory University School of Medicine
Atlanta, GA, USA

Emily C. Hartmann, MD, MS
Aesthetic Surgery Fellow
Plastic and Reconstructive Surgery
University of Southern California
Los Angeles, CA, USA

Nima Khavanin, MD
Resident Physician
Department of Plastic and Reconstructive Surgery
Johns Hopkins Hospital
Baltimore, MD, USA

John Y. S. Kim, MD
Professor and Clinical Director
Department of Surgery
Division of Plastic Surgery
Northwestern University Feinberg School of Medicine
Chicago, IL, USA

Steven Kronowitz, MD
Owner, Kronowitz Plastics PLLC
University of Texas, M. D. Anderson Medical Center
Houston, TX, USA

John V. Larson, MD
Resident Physician
Division of Plastic and Reconstructive Surgery
Keck School of Medicine of USC
Los Angeles, CA, USA

Z-Hye Lee, MD
Resident
Department of Plastic Surgery
New York University Medical Center
New York, NY, USA

Frank Lista, MD, FRCSC
Medical Director
The Plastic Surgery Clinic
Mississauga, Ontario, Canada;
Assistant Professor Surgery
University of Toronto
Toronto, Ontario, Canada

Albert Losken, MD, FACS
Professor of plastic surgery and Program Director
Emory Division of Plastic and Reconstructive Surgery
Emory University School of Medicine
Atlanta, GA, USA

Charles M. Malata, BSc(HB), MB ChB, LRCP, MRCS, FRCS(Glasg), FRCS(Plast)
Professor of Academic Plastic Surgery
Postgraduate Medical Institute
Faculty of Health Sciences
Anglia Ruskin University
Cambridge and Chelsea, UK;
Consultant Plastic and Reconstructive Surgeon
Department of Plastic and Reconstructive Surgery
Cambridge Breast Unit at Addenbrooke’s Hospital
Cambridge University Hospitals NHS Foundation Trust
Cambridge, UK

Jaume Masià, MD, PhD
Chief and Professor of Plastic Surgery
Sant Pau University Hospital
Barcelona, Spain

G. Patrick Maxwell, MD, FACS
Clinical Professor of Surgery
Department of Plastic Surgery
Loma Linda University Medical Center
Loma Linda, CA, USA

James L. Mayo, MD
Microsurgery Fellow
Plastic Surgery
New York University
New York, NY, USA

Roberto N. Miranda, MD
Professor
Department of Hematopathology
Division of Pathology and Laboratory Medicine
MD Anderson Cancer Center
Houston, TX, USA

Colin M. Morrison, MSc (Hons) FRCSI (Plast)
Consultant Plastic Surgeon
St. Vincent’s University Hospital
Dublin, Ireland

Maxime Y. Nahabedian, MD, FACS
Professor and Chief
Section of Plastic Surgery
MedStar Washington Hospital Center
Washington DC, USA;
Vice Chairman
Department of Plastic Surgery
MedStar Georgetown University Hospital
Washington DC, USA

James D. Nannoum, MD
Clinical Professor of Plastic Surgery
Atlanta Plastic Surgery
Emory University School of Medicine
Atlanta, GA, USA

Maria E. Nelson, MD
Assistant Professor of Clinical Surgery
Department of Surgery, Division of Upper GI/
General Surgery, Section of Surgical Oncology
Keck School of Medicine
University of Southern California
Los Angeles, CA, USA

Julie Park, MD
Associate Professor of Surgery
Section of Plastic Surgery
University of Chicago
Chicago, IL, USA

Ketan M. Patel, MD
Assistant Professor of Surgery
Division of Plastic and Reconstructive Surgery
Keck Medical Center of USC
Los Angeles, CA, USA

Nakul Gamanlal Patel, BSc(Hons), MBBS(Lond), FRCS(Plast)
Senior Microsurgery Fellow
St. Andrew’s Centre for Plastic Surgery
Broomfield Hospital
Chelmsford, UK

Gemma Pons, MD, PhD
Head
Microsurgery Unit
Plastic Surgery
Hospital de Sant Pau
Barcelona, Spain

Julian J. Pribaz, MD
Professor of Surgery
Brigham and Women’s Hospital
Harvard Medical School
Boston, MA, USA

Venkat V. Ramakrishnan, MS, FRCS, FRACS(Plast Surg)
Consultant Plastic Surgeon
St. Andrew’s Centre for Plastic Surgery
Broomfield Hospital
Chelmsford, UK

Elena Rodriguez-Bauzà, MD
Plastic Surgery Department
Hospital Santa Creu i Sant Pau
Barcelona, Spain

Michael R. Schwartz, MD
Board Certified Plastic Surgeon
Private Practice
Westlake Village, CA, USA

Stephen F. Sener, MD
Professor of Surgery, Clinical Scholar
Chief of Breast, Endocrine, and Soft Tissue Surgery
Department of Surgery, Keck School of Medicine of USC
Chief of Surgery and Associate Medical Director
Perioperative Services
LAC+USC (LA County) Hospital
Los Angeles, CA, USA
Joseph M. Serletti, MD, FACS
The Henry Royster–William Maul Measey
Professor of Surgery and Chief
Division of Plastic Surgery
University of Pennsylvania Health System
Philadelphia, PA, USA

Deana S. Shenaq, MD
Chief Resident
Department of Surgery - Plastic Surgery
The University of Chicago Hospitals
Chicago, IL, USA

Kenneth C. Shestak, MD
Professor, Department of Plastic Surgery
University of Pittsburgh Medical Center
Pittsburgh, PA, USA

Ron B. Somogyi, MD MSc FRCSC
Plastic and Reconstructive Surgeon
Assistant Professor, Department of Surgery
University of Toronto
Toronto, ON, Canada

David H. Song, MD, MBA, FACS
Regional Chief, MedStar Health
Plastic and Reconstructive Surgery
Professor and Chairman
Department of Plastic Surgery
Georgetown University School of Medicine
Washington, DC, USA

The late Scott L. Spear1, MD
Formerly Professor of Plastic Surgery
Division of Plastic Surgery
Georgetown University
Washington, MD, USA

Michelle A. Spring, MD, FACS
Program Director
Glacier View Plastic Surgery
Kalispell Regional Medical Center
Kalispell, MT, USA

W. Grant Stevens, MD, FACS
Clinical Professor of Surgery
Marina Plastic Surgery Associates;
Keck School of Medicine of USC
Los Angeles, CA, USA

Elizabeth Stirling Craig, MD
Plastic Surgeon and Assistant Professor
Department of Plastic Surgery
University of Texas
MD Anderson Cancer Center
Houston, TX, USA

Simon G. Talbot, MD
Assistant Professor of Surgery
Brigham and Women’s Hospital
Harvard Medical School
Boston, MA, USA

Jana Van Thielen, MD
Plastic Surgery Department
Brussels University Hospital
Vrij Universitaire Brussel (VUB)
Brussels, Belgium

Henry Wilson, MD, FACS
Attending Plastic Surgeon
Private Practice
Plastic Surgery Associates
Lynchburg, VA, USA

Kai Yuen Wong, MA, MB BChir, MRCS, FHEA, FRSPH
Specialist Registrar in Plastic Surgery
Department of Plastic and Reconstructive Surgery
Cambridge University Hospitals NHS Foundation Trust
Cambridge, UK

VOLUME SIX
Hee Chang Ahn, MD, PhD
Professor
Department of Plastic and Reconstructive Surgery
Hanyang University Hospital School of Medicine
Seoul, South Korea

Nidal F. Al Deek, MD
Surgeon
Plastic and Reconstructive Surgery
Chang Gung Memorial Hospital
Taipe, Taiwan

Kodi K. Azari, MD, FACS
Reconstructive Transplantation Section Chief
Professor
Department of Orthopedic Surgery
UCLA Medical Center
Santa Monica, CA, USA

Carla Baldrighi, MD
Staff Surgeon
Pediatric Surgery Meyer Children’s Hospital
Pediatric Hand and Reconstructive Microsurgery Unit
Azienda Ospedaliera Universitaria Careggi
Florence, Italy

Gregory H. Borschel, MD, FAA, FACS
Assistant Professor
University of Toronto Division of Plastic and Reconstructive Surgery;
Assistant Professor
Institute of Biomaterials and Biomedical Engineering;
Associate Scientist
The SickKids Research Institute
The Hospital for Sick Children
Toronto, Ontario, Canada

Kirsty Usher Boyd, MD, FRCSC
Assistant Professor
Division of Plastic Surgery, University of Ottawa
Ottawa, Ontario, Canada

Gerald Brandacher, MD
Scientific Director
Department of Plastic and Reconstructive Surgery
Johns Hopkins University School of Medicine
Baltimore, MD, USA

Lesley Butler, MPH
Clinical Research Coordinator
Charles E. Seay, Jr. Hand Center
Texas Scottish Rite Hospital for Children
Dallas, TX, USA

Ryan P. Calfee, MD
Associate Professor
Department of Orthopedic Surgery
Washington University School of Medicine
St. Louis, MO, USA

Brian T. Carlsten, MD
Associate Professor
Departments of Plastic and Orthopedic Surgery
Mayo Clinic
Rochester, MN, USA

David W. Chang, MD
Professor
Division of Plastic and Reconstructive Surgery
The University of Chicago Medicine
Chicago, IL, USA

James Chang, MD
Johnson & Johnson Distinguished Professor
Division of Plastic and Reconstructive Surgery
Stanford University Medical Center
Stanford, CA, USA

Robert A. Chase, MD
Holman Professor of Surgery – Emeritus
Stanford University Medical Center
Stanford, CA, USA

Alphansus K. S. Chong, MBBS, MRCS, MMed(Orth), FAMS (Hand Surg)
Senior Consultant
Department of Hand and Reconstructive Microsurgery
National University Health System
Singapore;
Assistant Professor
Department of Orthopedic Surgery
Yong Loo Lin School of Medicine
National University of Singapore
Singapore

David Chwel-Chin Chuang, MD
Senior Consultant, Ex-President, Professor
Department of Plastic Surgery
Chang Gung University Hospital
Taoyuan, Taiwan

Kevin C. Chung, MD, MS
Chief of Hand Surgery
Michigan Medicine
Charles B G De Nancrede Professor, Assistant Dean for Faculty Affairs
University of Michigan Medical School
Ann Arbor, Michigan, USA

Christopher Cox, MD
Attending Surgeon
Kaiser Permanentene
Walnut Creek, CA, USA
Catherine Curtin, MD
Associate Professor
Department of Surgery Division of Plastic Surgery
Stanford University
Stanford, CA, USA

Lars B. Dahlin, MD, PhD
Professor and Consultant
Department of Clinical Sciences, Malmö – Hand Surgery
University of Lund
Malmö, Sweden

Kenneth W. Donohue, MD
Hand Surgery Fellow
Division of Plastic Surgery
Department of Orthopedic Surgery
Baylor College of Medicine
Houston, TX, USA

Gregory A. Dumanian, MD, FACS
Stateville Professor of Surgery
Division of Plastic Surgery
Northwestern Feinberg School of Medicine
Chicago, IL, USA

William W. Dzwierzynski, MD
Professor and Program Director
Department of Plastic Surgery
Medical College of Wisconsin
Milwaukee, WI, USA

Simon Farnebo, MD, PhD
Associate Professor and Consultant Hand Surgeon
Department of Plastic Surgery, Hand Surgery and Burns
Institution of Clinical and Experimental Medicine, University of Linköping
Linköping, Sweden

Ida K. Fox, MD
Assistant Professor of Plastic Surgery
Department of Surgery
Division of Plastic and Reconstructive Surgery
Washington University School of Medicine
St. Louis, MO, USA

Paige M. Fox, MD, PhD
Assistant Professor
Department of Surgery, Division of Plastic and Reconstructive Surgery
Stanford University Medical Center
Stanford, CA, USA

Jeffrey B. Friedrich, MD
Professor of Surgery and Orthopedics
Department of Surgery, Division of Plastic Surgery
University of Washington
Seattle, WA, USA

Steven C. Haase, MD, FACS
Associate Professor
Department of Surgery, Section of Plastic Surgery
University of Michigan Health
Ann Arbor, MI, USA

Elisabet Hagert, MD, PhD
Associate Professor
Department of Clinical Science and Education
Karolinska Institute;
Chief Hand Surgeon
Hand Foot Surgery Center
Stockholm, Sweden

Warren C. Hammert, MD
Professor of Orthopedic and Plastic Surgery
Chief, Division of Hand Surgery
Department of Orthopedics and Rehabilitation
University of Rochester
Rochester, NY, USA

Isaac Harvey, MD
Clinical Fellow
Department of Pediatric Plastic and Reconstructive Surgery
Hospital for SickKids
Toronto, Ontario, Canada

Vincent R. Hentz, MD
Emeritus Professor of Surgery and Orthopedic Surgery (by courtesy)
Stanford University
Stanford, CA, USA

Jonay Hill, MD
Clinical Assistant Professor
Anesthesiology, Perioperative and Pain Medicine
Stanford University School of Medicine
Stanford, CA, USA

Steven E. R. Hovius, MD, PhD
Former Head, Department of Plastic, Reconstructive and Hand Surgery
Erasmus MC
University Medical Center
Rotterdam, the Netherlands;
Xpert Clinic, Hand and Wrist Center
The Netherlands

Jerry I. Huang, MD
Associate Professor
Department of Orthopedics and Sports Medicine
University of Washington;
Program Director
University of Washington Hand Fellowship
University of Washington
Seattle, WA, USA

Marco Innocenti, MD
Associate Professor of Plastic Surgery,
University of Florence;
Director, Reconstructive Microsurgery
Department of Oncology
Careggi University Hospital
Florence, Italy

Neil F. Jones, MD, FRCS
Professor and Chief of Hand Surgery
University of California Medical Center;
Professor of Orthopedic Surgery;
Professor of Plastic and Reconstructive Surgery
University of California Irvine
Irvine, CA, USA

Ryosuke Kakinoki, MD, PhD
Professor of Hand Surgery and Microsurgery,
Reconstructive, and Orthopedic Surgery
Department of Orthopedic Surgery
Faculty of Medicine
Kindai University
Osakasayama, Osaka, Japan

Jason R. Kang, MD
Chief Resident
Department of Orthopedic Surgery
Stanford Hospital & Clinics
Redwood City, CA, USA

Joseph S. Khouri, MD
Resident
Division of Plastic Surgery, Department of Surgery
University of Rochester
Rochester, NY, USA

Todd Kuiken, MD, PhD
Professor
Departments of PM&R, BME, and Surgery
Northwestern University;
Director, Neural Engineering Center for Artificial Limbs
Rehabilitation Institute of Chicago
Chicago, IL, USA

Donald Lalonde, BSC, MD, MSc, FRCSC
Professor of Surgery
Division of Plastic and Reconstructive Surgery
Saint John Campus of Dalhousie University
Saint John, New Brunswick, Canada

W. P. Andrew Lee, MD
The Milton T. Edgerton MD, Professor and Chairman
Department of Plastic and Reconstructive Surgery
Johns Hopkins University School of Medicine
Baltimore, MD, USA

Anais Legrand, MD
Postdoctoral Research Fellow
Plastic and Reconstructive Surgery
Stanford University Medical Center
Stanford, CA, USA

Terry Light, MD
Professor
Department of Orthopedic Surgery
Loyola University Medical Center
Maywood, IL, USA

Jin Xi Lim, MBBS, MRCS
Senior Resident
Department of Hand and Reconstructive Microsurgery
National University Health System
Singapore

Joseph Lopez, MD, MBA
Resident, Plastic and Reconstructive Surgery
Department of Plastic and Reconstructive Surgery
Johns Hopkins University School of Medicine
Baltimore, MD, USA
Susan E. Mackinnon, MD
Sydney M. Shoenberg, Jr. and Robert H. Shoenberg Professor
Department of Surgery, Division of Plastic and Reconstructive Surgery
Washington University School of Medicine
St. Louis, MO, USA

Brian Mailey, MD
Assistant Professor of Surgery
Institute for Plastic Surgery
Southern Illinois University
Springfield, IL, USA

Steven J. McCabe, MD, MSc, FRCS(C)
Director of Hand and Upper Extremity Program
University of Toronto
Toronto Western Hospital
Toronto, Ontario, Canada

Kai Megerle, MD, PhD
Assistant Professor
Clinic for Plastic Surgery and Hand Surgery
Technical University of Munich
Munich, Germany

Amy M. Moore, MD
Assistant Professor of Surgery
Division of Plastic and Reconstructive Surgery
Department of Surgery
Washington University School of Medicine
St. Louis, MO, USA

Steven L. Moran, MD
Professor and Chair of Plastic Surgery
Division of Plastic Surgery, Division of Hand and Microsurgery;
Professor of Orthopedics
Rochester, MN, USA

Rebecca L. Neiduski, PhD, OTR/L, CHT
Dean of the School of Health Sciences
Professor of Health Sciences
Elon University
Elon, NC, USA

David T. Netscher, MD
Program Director, Hand Surgery Fellowship;
Clinical Professor, Division of Plastic Surgery and Department of Orthopedic Surgery
Baylor College of Medicine;
Adjunct Professor of Clinical Surgery (Plastic Surgery)
Weill Medical College
Cornell University
Houston, TX, USA

Michael W. Neumeister, MD
Professor and Chairman
Division of Plastic Surgery
Springfield Illinois University School of Medicine
Springfield, IL, USA

Shelley Noland, MD
Assistant Professor
Division of Plastic Surgery
Mayo Clinic Arizona
Phoenix, AZ, USA

Christine B. Novak, PT, PhD
Associate Professor
Department of Surgery, Division of Plastic and Reconstructive Surgery
University of Toronto
Toronto, Ontario, Canada

Scott Oates, MD
Deputy Department Chair;
Professor
Department of Plastic Surgery, Division of Surgery
The University of Texas MD Anderson Cancer Center
Houston, TX, USA

Kerby Oberg, MD, PhD
Associate Professor
Department of Pathology and Human Anatomy
Loma Linda University School of Medicine
Loma Linda, CA, USA

Scott Oishi, MD
Director, Charles E. Seay, Jr. Hand Center
Texas Scottish Rite Hospital for Children;
Professor, Department of Plastic Surgery and Department of Orthopedic Surgery
University of Texas Southwestern Medical Center
Dallas, TX, USA

William C. Pederson, MD, FACS
President and Fellowship Director
The Hand Center of San Antonio;
Adjunct Professor of Surgery
The University of Texas Health Science Center at San Antonio
San Antonio, TX, USA

Dang T. Pham, MD
General Surgery Resident
Department of Surgery
Houston Methodist Hospital
Houston, TX, USA

Karl-Josef Prommersberger, MD, PhD
Chair, Professor of Orthopedic Surgery
Clinic for Hand Surgery
Bad Neustadt/Saale, Germany

Carina Reinholdt, MD, PhD
Senior Consultant in Hand Surgery
Center for Advanced Reconstruction of Extremities
Sahlgrenska University Hospital/ Malmöland Malmöland, Sweden;
Assistant Professor
Department of Orthopedics
Institute for Clinical Sciences
Sahlgrenska Academy
Goteborg, Sweden

Justin M. Sacks, MD, MBA, FACS
Director, Oncological Reconstruction;
Assistant Professor
Department of Plastic and Reconstructive Surgery
Johns Hopkins School of Medicine
Baltimore, MD, USA

Douglas M. Sammer, MD
Associate Professor of Plastic and Orthopedic Surgery
Chief of Plastic Surgery at Parkland Memorial Hospital
Program Director Hand Surgery Fellowship
University of Texas Southwestern Medical Center
Dallas, TX, USA

Subhro K. Sen, MD
Clinical Associate Professor
Plastic and Reconstructive Surgery
Robert A. Chase Hand and Upper Limb Center
Stanford University School of Medicine
Stanford, CA, USA

Pundrique R. Sharma, MBBS, PhD and FRCS (Plast)
Consultant Plastic Surgeon
Department for Plastic and Reconstructive Surgery
Alder Hey Children’s Hospital
Liverpool, UK

Randolph Sherman, MD, FACS
Chair
Department of Surgery
Cedars-Sinai Medical Center
Los Angeles, CA, USA

Jaimie T. Shores, MD
Clinical Director, Hand/Arm Transplant Program
Department of Plastic and Reconstructive Surgery
Johns Hopkins University School of Medicine
Baltimore, MD, USA

Vanila M. Singh, MD, MACM
Clinical Associate Professor
Anesthesiology, Perioperative and Pain Medicine
Stanford University School of Medicine
Stanford, CA, USA

Jason M. Souza, MD, LCDR, MC, USN
Staff Plastic Surgeon, United States Navy
Walter Reed National Military Medical Center
Bethesda, MD, USA

Amir Taghinia, MD, MPH
Attending Surgeon
Department of Plastic and Oral Surgery
Boston Children’s Hospital;
Assistant Professor of Surgery
Harvard Medical School
Boston, MA, USA

David M. K. Tan, MBBS
Senior Consultant
Department of Hand and Reconstructive Microsurgery
National University Health System
Singapore;
Assistant Professor
Department of Orthopedic Surgery
Yong Loo Lin School of Medicine
National University Singapore
Singapore
Jin Bo Tang, MD
Professor and Chair
Department of Hand Surgery;
Chair, The Hand Surgery Research Center
Affiliated Hospital of Nantong University
Nantong, The People’s Republic of China

Johan Thorfinn, MD, PhD
Senior Consultant of Plastic Surgery, Burn Unit;
Co-Director
Department of Plastic Surgery, Hand Surgery and Burns
Linköping University Hospital
Linköping, Sweden

Michael Tonkin, MBBS, MD, FRACS(Orth), FRCS(Ed Orth)
Professor of Hand Surgery
Department of Hand Surgery and Peripheral Nerve Surgery
Royal North Shore Hospital
The Children’s Hospital at Westmead
University of Sydney Medical School
Sydney, New South Wales, Australia

Joseph Upton III, MD
Staff Surgeon
Department of Plastic and Oral Surgery
Boston Children’s Hospital;
Professor of Surgery
Harvard Medical School
Boston, MA, USA

Francisco Valero-Cuevas, PhD
Director
Brain-Body Dynamics Laboratory;
Professor of Biomedical Engineering;
Professor of Biokinesiology and Physical Therapy;
(By courtesy) Professor of Computer Science and Aerospace and Mechanical Engineering
The University of Southern California
Los Angeles, CA, USA

Christianne A. van Nieuwenhoven, MD, PhD
Plastic Surgeon/Hand Surgeon
Plastic and Reconstructive Surgery
Erasmus Medical Centre
Rotterdam, the Netherlands

Nicholas B. Vedder, MD
Professor of Surgery and Orthopedics
Chief of Plastic Surgery Vice Chair
Department of Surgery
University of Washington
Seattle, WA, USA

Andrew J. Watt, MD
Attending Hand and Microvascular Surgeon;
Associate Program Director, Buncke Clinic Hand and Microsurgery Fellowship;
Adjunct Clinical Faculty, Stanford University
Division of Plastic and Reconstructive Surgery
The Buncke Clinic
San Francisco, CA, USA

Joseph Upton III, MD
Staff Surgeon
Department of Plastic and Oral Surgery
Boston Children’s Hospital;
Professor of Surgery
Harvard Medical School
Boston, MA, USA

Fu-Chan Wei, MD
Professor
Department of Plastic Surgery
Chang Gung Memorial Hospital
Taoyuan, Taiwan

Julie Colantoni Woodside, MD
Orthopedic Surgeon
OrthoCarolina
Gastonia, NC, USA

Jeffrey Yao, MD
Associate Professor
Department of Orthopedic Surgery
Stanford Hospital & Clinics
Redwood City, CA, USA
My wife, Gabrielle Kane, has always been my rock. She not only encourages me in my work but gives constructive criticism bolstered by her medical expertise as well as by her knowledge and training in education. I can never repay her. The editorial team at Elsevier have made this series possible. Belinda Kuhn leads the group of Alexandra Mortimer, Louise Cook, and the newest addition to the team, Sam Crowe. The Elsevier production team has also been vital in moving this project along. The volume editors, Geoff Gurtner, Peter Rubin, Ed Rodriguez, Joe Losee, David Song, Mo Nahabedian, Jim Chang, and Dan Liu have shaped and refined this edition, making vital changes to keep the series relevant and up-to-date. My colleagues in the University of Washington, headed by Nick Vedder, have provided continued encouragement and support. Finally, and most importantly, the residents and fellows who pass through our program keep us on our toes and ensure that we give them the best possible solutions to their questions.

Peter C. Neligan, MB, FRCS(I), FRCSc, FACS

I’d like to thank all the authors for their commitment to producing this volume, my colleagues and residents at the University of Chicago Medical Center, MedStar Health and Georgetown University School of Medicine who work tirelessly to advance Plastic Surgery; my parents who first inspired me to seek knowledge; and most importantly my wife Janie and my daughters Olivia, Ava, and Ella without whom this and all work loses meaning and significance for me.

David H. Song, MD, MBA, FACS
Dedicated to future plastic surgeons. Take up the torch and lead us forward!