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<b>Section 1. Introduction</b>			
<b>Chapter 1 – Welcome</b>	Brian Sutton MS, MA	Casey DeJong MIS, MEd, MBA	
<b>Chapter 2 – Introduction to Physique Enhancement</b>	Eric Helms PhD	Conor Heffernan PhD	Guillermo Escalante DSc, MBA, ATC
<b>Section 2. Physiology, Anatomy, and Biomechanics of Physique Enhancement</b>			
<b>Chapter 3 – Fundamentals of Anatomy, Physiology, and Biomechanics</b>	Darryn Willoughby PhD	Eric Trexler PhD	Guillermo Escalante DSc, MBA, ATC
<b>Chapter 4 – Essentials of Metabolism, Energy Balance, and Fat Loss</b>	Brad Dieter PhD	Joey Munoz PhD	Guillermo Escalante DSc, MBA, ATC
<b>Chapter 5 – Mechanism of Muscle Hypertrophy</b>	Brad Schoenfeld PhD	Bill Campbell PhD	Guillermo Escalante DSc, MBA, ATC
<b>Section 3. Nutrition Principles</b>			
<b>Chapter 6 - Macronutrients</b>	Adam Gonzalez PhD	Dan Newmire PhD	Guillermo Escalante DSc, MBA, ATC
<b>Chapter 7 – Micronutrients and Hydration</b>	Dan Newmire PhD	Darryn Willoughby PhD	Guillermo Escalante DSc, MBA, ATC
<b>Chapter 8 – Supplementation</b>	Dean St. Mart PhD	Scott Stevenson PhD	Guillermo Escalante DSc, MBA, ATC
<b>Chapter 9 – Performance Enhancing Drugs</b>	Dean St. Mart PhD	Scott Stevenson PhD	Guillermo Escalante DSc, MBA, ATC
<b>Section 4. Body Aesthetics, Fitness, and Nutrition Assessments</b>			
<b>Chapter 10 – Fitness and Body Aesthetics Assessment</b>	Brandon Roberts PhD Laurin Conlin MS	Eric Trexler PhD	Guillermo Escalante DSc, MBA, ATC
<b>Chapter 11 – Nutrition Assessment</b>	Brad Dieter PhD	Chris Barakat MS, ATC, CISSN	Guillermo Escalante DSc, MBA, ATC
<b>Section 5. Exercise Training Principles</b>			
<b>Chapter 12 – Warm,-up, Recovery, and Injury Prevention</b>	Nick Rolnick DPT	Chris Barakat MS, ATC, CISSN	Guillermo Escalante DSc, MBA, ATC
<b>Chapter 13 – Resistance and Core Training</b>	Chris Barakat MS, ATC, CISSN	Scott Stevenson PhD	Guillermo Escalante DSc, MBA, ATC
<b>Chapter 14 – Cardiorespiratory Training and Non-Exercise Activity Thermogenesis</b>	Eric Trexler PhD	Darryn Willoughby PhD	Guillermo Escalante DSc, MBA, ATC

Section 6. Programming and Coaching Principles			
<b>Chapter 15 – Coaching Principles</b>	Laurin Conlin MS	Jesse Stapleton PhD	Guillermo Escalante DSc, MBA, ATC
<b>Chapter 16 – Exercise Programming</b>	Brian Sutton MS, MA Jaymes Longstrom MS	Eric Helms PhD	Guillermo Escalante DSc, MBA, ATC
<b>Chapter 17 – Nutrition Programming</b>	Joey Munoz PhD	Eric Helms PhD	Guillermo Escalante DSc, MBA, ATC
<b>Chapter 18 – Peaking for Competition or Personal Goals</b>	Scott Stevenson PhD	Eric Helms PhD	Guillermo Escalante DSc, MBA, ATC
<b>Chapter 19 – Physique Transformation Sustainability</b>	Brandon Roberts PhD	Casey DeJong MEd, MIS, MBA	Guillermo Escalante DSc, MBA, ATC
<b>BONUS – Exercise Programming Manual</b>	Andre Adams NASM Master Trainer, IFBB Pro	Sunny Andrews MD	Brian Sutton MS, MA
<b>BONUS — Nutrition Programming Manual</b>	Chris Tuttle MS, RD, CDN	Brian Sutton MS, MA	

## Contributors and Peer Reviewers

- **Adam Gonzalez, PhD**

Adam M. Gonzalez, Ph.D., is an Associate Professor in the Department of Allied Health and Kinesiology at Hofstra University. He holds a Ph.D. in Exercise Physiology from the University of Central Florida. He has also earned a bachelor’s degree in Health and Exercise Science, and a master’s in Health Science Education from The College of New Jersey. Dr. Gonzalez has years of experience researching sports science, exercise physiology, and nutritional interventions. His primary research interests include exercise and dietary strategies to optimize body composition, maximize health, and enhance adaptations to exercise. He also holds certifications as a Certified Strength and Conditioning Specialist (CSCS) under the National Strength and Conditioning Association and a Certified Sports Nutritionist Certification (CISSN) under the International Society of Sports Nutrition.

- **Andre Adams, IFBB Professional**

Andre Adams is a professional athlete with the International Federation of Bodybuilding (IFBB) pro league, having competed in Mr. Olympia and Arnold Classic professional physique divisions. He is also a Master Trainer with the National Academy of Sports Medicine (NASM), a physique contest prep coach, and he holds several specializations with NASM, including NASM-CPT, WFS, PES, WLS, GPTS, FNS, and Master Trainer. Andre is a highly sought-after writer/author, speaker, and fitness coach for companies such as Insider Media, 1st Phorm, Ironmaster, Titan Medical Center, NASM, and more. Additionally, Andre launched a personal fitness brand (Andre Adams Official LLC) and a brick-and-mortar gym in Kenosha, WI.

- **Bill Campbell, PhD**

Bill Campbell, Ph.D., is a Professor of Exercise Science and Director of the Performance and Physique Enhancement Laboratory at the University of South Florida. He received his Ph.D. in Exercise, Nutrition, and Preventive Health at Baylor University. Dr. Campbell has authored three

books on sports nutrition and is the author of more than 200 scientific abstracts and manuscripts centered on sports nutrition, physique enhancement, and exercise performance. He has led pioneering research on dietary protein intakes, rapid fat loss, and diet breaks for physique athletes and bodybuilders. Dr. Campbell is also a past President of the International Society of Sports Nutrition and an expert legal consultant for the dietary supplement industry.

- **Brad Dieter, Ph.D., MS**

Brad Dieter is a Ph.D., MS, scientist, and entrepreneur whose goal is to bring science and industry together to improve human health and well-being. He is a leader in health, wellness, and applied biotechnology. He has led several companies in the online spaces of health and wellness space and biotechnology from inception to eight-figure valuations. He currently serves as the Chief Operating Officer of Macros Inc, the Chief Scientific Advisor of Outplay Inc, and sits on the Scientific Advisory Board for the National Academy of Sports Medicine.

- **Brad Schoenfeld, PhD, CSCS, CSPS, FNSCA**

Brad Schoenfeld, Ph.D., is a professor of exercise science at Lehman College in the Bronx, New York, where he serves as the graduate director of the Human Performance and Fitness program. Dr. Schoenfeld has published over 250 peer-reviewed scientific papers on various exercise- and sports nutrition-related topics and authored the seminal textbook *Science and Development of Muscle Hypertrophy*. His research has been cited in over 15,000 peer-reviewed papers, and he is currently ranked as the world's top researcher on the topic of resistance training by ExpertScape, an independent site that grades researchers based on their scholarly activity. He was the recipient of the 2016 Dwight D. Eisenhower Fitness Award, presented by the United States Sports Academy for outstanding achievement in fitness and contributions to the growth and development of sport fitness through outstanding leadership activity, as well the recipient of the 2018 National Strength and Conditioning Association Young Investigator of the Year Award. In addition to his academic efforts, Dr. Schoenfeld has consulted with numerous professional sports teams and formerly served as sports nutritionist for the New Jersey Devils hockey organization.

- **Brandon Roberts, Ph.D.**

Brandon Roberts, Ph.D., is a scientist, author, and physique athlete. He has a BS in Microbiology, an MS in Human Performance, and a Ph.D. in Muscle Biology, all from the University of Florida. Dr. Roberts has published more than 25 peer-reviewed publications on exercise and nutrition and has been cited more than 1,000 times. He has competed in several national-level bodybuilding competitions, has coached over 100 physique athletes, and serves as the Chief Science Officer for Tailored Coaching Method.

- **Brian Sutton, MS, MA, NASM-CPT, PES, CES, CSCS**

Brian is a 20-year veteran in the health and fitness industry and a Senior Content and Development Management for NASM. He earned an MA in Sport and Fitness Management from the University of San Francisco, an MS in Exercise Science from the California University of Pennsylvania, and several certifications from NASM and NSCA. He served as an adjunct faculty member for the California University of Pennsylvania, teaching graduate-level courses in corrective exercise, performance enhancement, and health and fitness.

- **Chris Tuttle, MS, RD, CDN**

Chris Tuttle is a Registered Dietitian, retired IFBB professional bodybuilder, and contest prep coach. He began a nutrition business, Tuttle Nutrition, in 2015, enabling him to better share his

extensive knowledge of nutrition and exercise with his clients, specifically offering services in weight loss, sports performance, contest preparation, medical nutrition therapy, bodybuilding, fitness and figure competitions, and educational lectures. Chris received his bachelor's degree in Nutrition and Dietetics at the University of New Haven. From there, he expanded his understanding of nutrition by completing a Dietetic Internship at Stony Brook University Hospital in New York. After leaving New York, he earned a Master's in Nutrition from the University of Saint Joseph.

- **Christopher Barakat, MS, ATC, CISSN**

Christopher Barakat is a professional natural bodybuilder, coach, and researcher who specializes in physique optimization science. His primary interests are investigating training and nutritional practices that enhance performance and body composition outcomes. He's an instructor at the University of Tampa and continues investigating gaps within the scientific literature in the human performance lab. Chris coaches and educates clients at the School of Gainz on health, fitness, and physique goals. Over the past decade, he's dedicated his life's work to physique transformation through his personal and professional endeavors. His passion for bodybuilding stems from the internal empowerment and growth that occurs through practicing the self-discipline that the bodybuilding process encompasses. He received his bachelor's degree in Athletic Training from Stony Brook University and a Masters in Exercise & Nutrition Science from the University of Tampa.

- **Conor Heffernan, Ph.D.**

Conor Heffernan, Ph.D., is a lecturer in the Sociology of Sport at Ulster University. He attained his Ph.D. in History from the University College Dublin and a Masters in Philosophy in Historical Studies from the University of Cambridge. He has published over 40 articles and books on the history of fitness, runs the popular history of fitness website Physical Culture Study, and is a regular contributor to media outlets on health, strength, and well-being.

- **Dan Newmire, Ph.D.**

Dr. Dan Newmire received his BA from the University of Iowa, his MS from Life University in Marietta, Georgia, and his Ph.D. from Texas Woman's University (TWU) in Denton, Texas. Dr. Newmire is an Assistant Professor of Exercise Physiology in the Kinesiology Department at Texas A&M University-Corpus Christi. His inter-disciplinarian team investigates the impact of thermotherapy (heat stress) on skeletal muscle gene and protein expression and the role of range of motion (ROM) during resistance exercise on muscle damage and hypertrophy. Their overall goal is to investigate how thermotherapy and ROM influence muscle metabolism to potentially translate to more practical and empirically based therapies. His goals are to explore muscle physiology and metabolism in both clinical and healthy populations utilizing resistance exercise, nutrition, and environmental factors for the benefit of health and performance.

- **Darryn Willoughby, Ph.D., FACSM, FISSN, FACN, FASEP, CSCS-D**

Dr. Willoughby holds BS and MEd degrees in Physical Education from Tarleton State University and a Ph.D. in Exercise Physiology with sub-emphases in Nutritional Biochemistry and Molecular Biology from Texas A&M University. He also possesses a graduate clinical certificate in Clinical Anatomy. Dr. Willoughby is a Fellow of the American College of Sports Medicine (ACSM), International Society of Sports Nutrition (ISSN), American College of Nutrition (ACN), and American Society of Exercise Physiologists (ASEP). He is a Certified Strength and

Conditioning Specialist through the National Strength and Conditioning Association, a Certified Sports Nutritionist through ISSN, and a Certified Exercise Physiologist through ASEP.

Dr. Willoughby is an active contributor to the field of resistance training and exercise/sports nutrition, with more than 150 publications in scientific peer-reviewed research journals and several book chapters on issues related to exercise and sports nutrition. Additionally, Dr. Willoughby has contributed to *Muscle and Fitness*, *Flex*, *The Sports Nutrition Insider*, *Men's Health*, and has spoken on many podcasts and radio programs.

- **Dean St. Mart, Ph.D.**

Dr. Dean St Mart is the Product Formulator for a UK-based supplement brand, Supplement Needs, and is a fitness-industry renowned pharmacologist for his no-nonsense approach to PED safety and health management through science. He holds a Double 1st Class Honours degree in Chemistry and Pharmaceutical Chemistry from the National University of Ireland Maynooth and a Ph.D. in Synthetic Organic Chemistry and Fluorescence Spectroscopy. His interests lie in performance-enhancing drug (PED) pharmacology, novel drug design, health supplementation, and applying functional medicine to athletes to improve their health. His love of functional medicine led to the creation of the Dr. Dean supplement range within the Supplement Needs brand, a place for consumers to purchase products that are dosed efficaciously backed by clinical research and without any hidden proprietary blends.

- **Eric Helms, Ph.D., CSCS**

Eric Helms is a Strength and Conditioning and Sports Physiology and Nutrition Research Fellow mentoring post-graduate students at the Auckland University of Technology (AUT). AUT is also where he completed his second Master's in Sports Nutrition and his Ph.D. in Strength and Conditioning. Prior to that, he completed a bachelor's degree in Fitness and Wellness and his first Masters in Exercise Science and Health Promotion at the California University of Pennsylvania. Eric communicates science via social media, on his podcast "Iron Culture", and at industry and academic conferences. He is the chief author of the Muscle and Strength Pyramids, he co-founded and reviews for Monthly Applications in Strength Sport (MASS), and sits on the advisory board for the Sports Nutrition Association and the Nutrition Coaching Global Mastermind. He is also an active athlete and competes in both drug-free bodybuilding and strength sport.

- **Eric Trexler, Ph.D.**

Eric Trexler, Ph.D., is a professional natural bodybuilder and a sports nutrition researcher. He earned a doctorate in Human Movement Science from UNC Chapel Hill and has published dozens of peer-reviewed research papers on various exercise and nutrition strategies for getting bigger, stronger, and leaner. Eric has several years of university-level teaching experience and has been coaching athletes with a wide variety of backgrounds and experience levels for over a decade. Eric is the Director of Education at Stronger By Science, a reviewer for Monthly Applications in Strength Sport (MASS), and a co-creator of the MacroFactor diet app.

- **Guillermo Escalante, DSc, MBA, ATC, CSCS\*D**

Dr. Escalante is a Professor of Kinesiology and a Dean Fellow for the College of Natural Sciences at California State University, San Bernardino. He holds a BS in Athletic Training with a minor in Biology, an MBA with concentrations in marketing and healthcare management, and a doctorate in Athletic Training. He is a certified athletic trainer through the National Athletic Trainers Association, a certified strength and conditioning specialist from the National Strength

and Conditioning Association (NSCA), and a certified sports nutritionist and fellow through the International Society of Sports Nutrition. He is an Associate Editor for the Journal of the International Society of Sports Nutrition, chair of the NSCA Bodybuilding Special Interest Group, and a science/healthcare business consultant to several businesses. He regularly speaks at national and international conferences and has published over 25 peer-reviewed publications and more than 50 mainstream publications in media, such as Muscle & Fitness, Muscle & Fitness Hers, Muscular Development, and Bodybuilding.com. Dr. Escalante has been involved in bodybuilding as a competitor, coach, judge, and/or medical provider. One of his goals is to bring more evidence-based practices to the sport to maximize results while minimizing health risks.

- **Jaymes Longstrom, MS**

Jaymes Longstrom earned his bachelor's degree in Exercise Science from Concordia University, St. Paul. In 2019, he graduated with his MS in Exercise Science from the University of South Florida. He has coordinated several research studies and presented original data at national conferences under the supervision of Dr. Bill Campbell in the Performance and Physique Enhancement Laboratory. He has been a personal trainer for over ten years, exclusively working online for the last five years. Jaymes also has competitive experience as a physique athlete and powerlifter. With his experience in the lab and the gym, he believes the value of research is in its practical application.

- **Jesse Stapleton, Ph.D.**

Dr. "J" Stapleton is an Assistant Professor of Kinesiology at the Brooks College of Health at the University of North Florida. Her research interests include the psychosocial mechanisms and consequences of sport and physical activity among student-athletes and persons with mobility impairment. Accordingly, Stapleton serves as a mental performance consultant for Osprey Athletics and USA Para Powerlifting. She is also a professional figure competitor within two natural bodybuilding organizations.

- **Joseph Muñoz, Ph.D.**

Dr. Joseph Muñoz completed his Ph.D. in nutritional sciences at Florida State University. He also completed a postdoctoral fellowship with a focus on sports nutrition under the direction of Dr. Michael Ormsbee. Dr. Muñoz has years of experience teaching undergraduate and graduate students various topics, including anatomy and physiology, metabolism, general nutrition, and research methodology courses. Currently, he works with online clients as a nutrition and physique coach. His main focus is to educate his clients using evidence-based practices to empower and provide them with the appropriate tools needed to take control of their nutrition and training and ultimately improve their health. Dr. Muñoz is a scientific advisor for Outwork Nutrition, a nutritional supplement company where his main role is to help with the formulation of evidence-based supplements to help improve athletic performance.

- **Laurin Conlin, MS**

Laurin Conlin is an IFBB Bikini Pro and owner of Team LoCoFit. She earned her MS in Exercise Science and focused her research on flexible dieting and weight regain. Laurin has expanded her company to a team of coaches who all prioritize scientific clarity and strategic coaching methods that give each client the tools they need to succeed along with the individual attention they deserve. She lectures internationally on topics including nutrition, training, the psychological aspects of dieting, and fitness entrepreneurship, and hosts The LoCoFit Show podcast.

- **Nick Rolnick, DPT**

Nicholas Rolnick, also known as The Human Performance Mechanic, is a physical therapist and performance enhancement specialist living and practicing in New York City. He has experience in competitive bodybuilding and a special interest in kinesiology, rehabilitation, muscle hypertrophy, and blood flow restriction training. In particular, his research interests are the safe application of blood flow restriction training to muscle hypertrophy. He is an adjunct professor at CUNY Lehman College, where he teaches kinesiology and biomechanics, as well as internships in rehabilitation. Outside of teaching, he is the co-founder and owner of the BFR Pros, one of the world's top Blood Flow Restriction course providers. Through his publications and speaking engagements at national and international conferences, Nick has become one of the foremost authorities on Blood Flow Restriction and runs BFR training workshops worldwide.

- **Scott Stevenson, Ph.D.**

Dr. Scott W. Stevenson is an applied exercise physiologist and competitive bodybuilder with over 40 years of experience in the gym. He is a former college professor at Cal Poly Pomona and University of Tampa, columnist for EliteFTS™, co-author of John Meadows' *The Brutality of Mountain Dog Training*, and author of *Be Your Own Bodybuilding Coach – A Reference Guide for Year Round Bodybuilding Success*. Scott's experience and knowledge is interwoven with exercise science in his bodybuilding training system, Fortitude Training®.

- **Sunny Andrews, MD**

Dr. Sunny Andrews attended the American University of The Caribbean for medical school and was trained at the University of Florida in surgical residency. She has also been a research fellow at both the Mayo Clinic and the University of Florida. Dr. Andrews owns On Szn Fitness LLC, which offers fitness and nutrition consulting and specializes in wellness competition coaching. Dr. Andrews began bodybuilding while living in St. Maarten during medical school, and she has been passionate about the sport ever since.