MELODIE FAIR METZGER

CURRICULUM VITAE
June 20, 2021

PROFESSIONAL CONTACT INFORMATION:

Orthopaedic Biomechanics Laboratory
Department of Orthopaedic Surgery, Cedars-Sinai Medical Center
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EDUCATION:

Bachelor of Arts, Bioengineering 2001
University of California, Berkeley, CA
Dean's List all semesters attended

Management of Technology Program 2008
HAAS School of Business, University of California, Berkeley, CA

Doctor of Philosophy, Bioengineering 2009
University of California, Berkeley and University of California, San Francisco Joint Graduate Program
Dissertation: *Evaluation of Spinal Reconstructive Surgeries Using Multi-Body System Dynamics*
Dissertation Chair: Professor Jeffery C. Lotz, Ph.D.

PROFESSIONAL EXPERIENCE:

Present Positions:

01/2020-	Assistant Professor, Faculty Research Scientist II Department of Orthopaedic Surgery, Cedars-Sinai Medical Center Director of the Orthopaedic Biomechanics Laboratory
10/2017-	Biomedical Engineering Associate, Independent Contractor Robson Forensic, Inc.

Previous Positions:

06/1999-09/1999	Research Assistant, Sierra Internal Medicine, Incline Village, NV. *Prepared blood and urine samples proctored computerized cognitive performance tests, and organized paperwork for an NIH open label and double-blind study on an experimental drug for the treatment of Chronic Fatigue Syndrome.*
06/2000-09/2000	Research Assistant, Medical Technology Program, Lawrence Livermore National Lab, Livermore, CA. *Functional testing of several neuro-interventional shape memory polymer devices*
06/2001-09/2002	Research Manager, Sierra Internal Medicine, Incline Village, NV.

	Coordinate and manage a three-site NIH clinical study of the impact of nutritional supplements on chronic fatigue syndrome.
09/2002-09/2003	Engineer, Medical Technology Program, Lawrence Livermore National Laboratory, Livermore, CA *Design, fabrication and experimental testing of several neuro-interventional shape memory polymer devices.*
09/2003–12/2004	President, Sierra Interventions, LLC, Berkeley, CA. *Administration oversight, supervised and coordinated all projects, including fabrication, device design, and experimental studies on an aneurysm treatment device.*
09/2004–06/2009	Graduate Studies, University of California, Berkeley and University of California, San Francisco Joint Graduate Program
08/2009-01/2015	Project Scientist, Instructor, Cedars-Sinai Medical Center
01/2015-01/2018	Faculty Research Scientist, Cedars-Sinai Medical Center
01/2018-01/2020	Assistant Professor, Faculty Research Scientist I, Cedars-Sinai Medical Center

PROFESSIONAL ACTIVITIES:

CSMC:

2011-	Resident Research Committee, Cedars-Sinai Medical Center
2011-	Resident Education Committee, Cedars-Sinai Medical Center
2015-	Kerlan-Jobe Fellowship Research Committee, Los Angeles, CA
2016-	Grant Reviewer, UCLA Clinical and Translational Science Institute
2020	David Geffin School of Medicine/Cedars-Sinai Women's Faculty Leadership Program

Professional Associations/Society Memberships:

1999-2001	Member, Tau Beta Pi, Engineering Honor Society
2009-2015	Member, The American Society of Mechanical Engineers
2010-2014	Member, AO Spine North America Foundation
2012-	Member, Orthopaedic Research Society

Editorial Services:

2009-2014	Scientific Reviewer, Spine Arthroplasty Society's Research Committee
2014-	Scientific Reviewer for American Journal of Sports Medicine
2015-	Scientific Reviewer for Journal of Engineering in Medicine
2015-	Scientific Reviewer for Journal of Medical and Biological Engineering
2016-	Grant Reviewer, UCLA Clinical and Translational Science Institute
2020-	Editorial Review Board for Arthroscopy
2020-	Scientific Reviewer for The Journal of Shoulder and Elbow Surgery
2021-	Abstract Reviewer, Orthopaedic Research Society Annual Meeting 2022

Community Services:

2005-2008	UCSF Graduate Student Association, Bioengineering representative
2017-2019	Governor, All Community Group, Ocean Charter School, Los Angeles, CA
2018-2019	Board Member, Ocean Charter School, Los Angeles, CA

HONORS AND SPECIAL AWARDS:

1998	Academic Recognition for Achievements in Mathematical Sciences *El Camino College Los Angeles, CA*

1998-1999	Kilpatrick, Moulett, L. Scholarship, Hearst, Phoebe, and Rodkey Scholarships recipient *University of California, Berkeley, CA*
2001	Travel Grant Recipient *American Society of Laser Medicine and Surgery*
2001	Nomination for University Medal *University of California, Berkeley, CA*
2005-2009	Graduate Research Fellowship Recipient *National Science Foundation*
2008	Earl C. Anthony Travel Award *University of California, San Francisco, CA*
2009	Graduate Student Association Travel Award *University of California, San Francisco, CA*
2012	Research Core Award *Clinical and Translational Science Institute (CTSI)*
2015	Research Core Award *Clinical and Translational Science Institute (CTSI)*
2017	Research Faculty of the Year Award *Cedars Sinai Medical Center Department of Orthopaedic Surgery*

RESEARCH GRANTS AND FELLOWSHIPS RECEIVED:

Active/Ongoing:

01/2021-12/2021
Musculoskeletal Transplant Foundation (MTF)
Junior Investigator Grant Award
Title: "Elbow Ulnar Collateral Ligament Reconstruction with Knee Collateral Ligament Allograft: A Biomechanical Study"
Role: Co-Principal Investigator

09/2020-08/2021
Cedars Sinai Center for Research in Women's Health and Sex Differences
Title: "Do Oral Contraceptives Protect Against Anterior Cruciate Ligament Injuries in Female Athletes?"
Role: Principal Investigator

06/2020-05/2021
OREF / JRGOS Orthopaedic Disparities Resident Research Grant
Title: "The Impact of Faculty and Resident Diversity on Resident Attrition"
Role: Co-Investigator

05/2020-02/2021
Arthrex Investigator Initiated Research Grant
Title: "Coronal Versus Sagittal Placement of Staple in Capitolunate Fusion: A Biomechanical Study"
Role: Co-Principal Investigator

01/2021-07/2021
Internal Department Funding
Title: "The Circumferential Labral Reconstruction: The Role Of The Graft Width"
Role: Co-Principal Investigator

01/2021-07/2021
Internal Department Funding
Title: “Hip Capsular Closure Following T-Type Capsulotomy. A Biomechanical Analysis of the Figure of Eight Versus Simple Suture Configuration”
Role: Co-Principal Investigator

Inactive/Completed:

07/2003-06/2004
NIH/NINDS
SBIR 1 R43 NS044816-1

“Interventional Applications of Shape Memory Polymer Foam”: Phase I study resulted in the development of a shape memory polymer foam device for filling and sealing cerebral aneurysm/arteriovenous malformation volumes.
Role: Principal Investigator

09/2004-08/2005
NIH/NHLBI
SBIR 1 R43 EB003702-1
“Polymer Actuator for Peripheral Vessel Thrombectomy”: Feasibility Phase I study produced a proof-of-concept device for the treatment of peripheral occlusive disease.
Role: Principal Investigator

AOSpine Hansjörg Wyss Grant
08/2010-05/2012
Title: “Does Sacral Geometry Affect Biomechanical Behavior and Facet Forces after Total Disc Replacement at the Lumbosacral Junction?” Start-up grant to investigate whether the degree of sacral slope alters the efficacy of total disc replacements
Role: Principal Investigator

Scoliosis Research Society Research Grant
01/2011-10/2012
Title: “Improving Bone Formation in Osteoporosis Through Mechanical Signaling Pathways” Start-up grant to determine the responsiveness of MSCs and osteoblasts derived from osteoporotic human bone to both biochemical and mechanical signals”
Role: Co-Principal Investigator

Stryker Spine Research Grant
07/2011-06/2014
"Biomechanical Analysis of the Effect of Different Instrumentation Techniques on Adjacent Level Stability After Long Segment Instrumentation of the Thoracic Spine"
Role: Principal Investigator

Scoliosis Research Society Research Grant
08/2011-10/2012
“The Relationship between Serum Vitamin D levels, Successful Fusion and Fusion Strength: A Quantitative Analysis"
Role: Principal Investigator

Medtronic Research Grant
07/2012-12/2014
“Biomechanical Analysis of Direct Lateral Interbody Fusion (DLIF) Strategies for Adjacent Segment Degeneration in the Lumbar Spine"
Role: Principal Investigator

American Association of Neurological Surgeon, Haid Research Award
07/2013-06/2014
“The Biomechanics of Sagittal Deformity: The Impact of Sacral Slope on Lumbosacral Interbody Fusion"
Role: Mentor

Scoliosis Research Society Research Grant
08/2014-7/2018
“The Impact of Type I Diabetes on Bone Metabolism and Growth after Spinal Fusion"
Role: Principal Investigator

North American Spine Society
Young Investigator Basic Research Grant
12/2014-06/2016
“The Impact of Type II Diabetes on Bone Metabolism and Growth after Spinal Fusion"
Role: Principal Investigator

Acumed Research Grant
11/2014-10/2015
“Buried Fixation of Patella Fractures: A Biomechanical Investigation" This study investigated the strength of a novel low-profile patella fracture repair technique”.
Role: Co-Investigator

Össur Research Grant
11/2014-10/2015
“The Effect of Dynamic Bracing on Articular Contact Pressures in PCL Deficient Knees"
Role: Principal Investigator

Orthopaedic Research and Education Foundation
New Investigator Research Grant
07/2015-12/2016
“The effect of Hamstring Tendon Autograft Harvest on the Restoration of Knee Stability in the Setting of Anterior Cruciate Ligament Rupture and Concurrent Medial Collateral Ligament Injury"
Role: Co-Principal Investigator

Orthopaedic Research and Education Foundation
Resident Research Grant
03/2017-01/2018
“Knot of Henry Variation and the Effect of Plantar Flexion Strength"
Role: Co-Investigator

AOTrauma North America (AOTNA)
Resident Research Grant
07/2017-06/2018
“Evaluation of Multiplanar Stability in Neer Type IIB Clavicle Fractures"
Role: Co-Investigator

Arthrex Investigator Initiated Research Grant
11/2017-10/2018
"A Biomechanical Comparison between Anterior Cruciate Ligament Repair Versus Reconstruction"
Role: Co-Principal Investigator

Arthrex Investigator Initiated Research Grant
11/2017-10/2018
"Biomechanical Evaluation of PCL Reconstruction Augmented with Internal Bracing"
Role: Co-Principal Investigator

Arthrex Investigator Initiated Research Grant
11/2017-10/2018
"Biomechanical Evaluation of Medial Ulnar Collateral Ligament Reconstruction with Ulnar Tunnels 1 cm from the Joint Line"
Role: Co-Principal Investigator

Medtronic Educational Grant
12/2018
Educational Grant to fund a cadaver skills lab for the residents in the Orthopaedic Biomechanics Laboratory
Role: Principal Investigator

Orthopaedic Research and Education Foundation (OREF)
Resident Clinician Scientist Training Grant
03/2018-06/2019
"Identifying and mitigating the effects of diabetes on intervertebral disc degeneration"
Role: Co-Investigator

American Orthopaedic Society for Sports Medicine (AOSSM)
Steven P. Arnoczky Young Investigator Grant
07/2018-06/2019
"Revisiting the Vascularity and Stem Cell Population of the Meniscal Avascular Zone Using 3D Imaging Technique"
Role: Co-Investigator

Arthrex Investigator Initiated Research Grant
12/2018-11/2019
"Biomechanical Evaluation of UCL Repair Using Suspensory Fixation"
Role: Co-Principal Investigator

Arthrex Investigator Initiated Research Grant
02/2019-01/2019
"Hip Capsular Management with the Pie Crusting Technique: A Biomechanical Analysis of Stability and Failure"
Role: Co-Principal Investigator

POSNA (Pediatric Orthopaedic Society of N. America) Directed Research Grant
3/2019-09/2020
"Pedicle Screw Placement with a 3D Deformity Model"
Role: Co-Investigator

2/1/2019-2/29/2020
Private Donor Funded
"Using Mixed Reality to Reduce Fatigue-Related Injuries and Diminished Performance in Ballet Dancers"
Role: Principal Investigator

03/01/2019-2/29/2020
Arthrex Investigator Initiated Research Grant
"Biomechanical Evaluation of Internal Brace Augmentation of Anterior Cruciate Ligament Reconstruction: Does Augmentation Protect ACL Grafts and Prevent Excess Graft Strain or Modify Failure"
Role: Co-Principal Investigator

05/01/2019-4/30/2020
Arthrex Investigator Initiated Research Grant
Material Transfer Agreement
"Comparison of Extensor Tendon Transfers for Ankle Dorsiflexion in Charcot-Marie-Tooth Disease"
Role: Co-Principal Investigator

06/01/2020-05/25/2021
OREF / JRGOS Orthopaedic Disparities Resident Research Grant
Title: "The Impact of Faculty and Resident Diversity on Resident Attrition"
Role: Co- Investigator

10/01/2019-03/31/2021
Musculoskeletal Transplant Foundation (MTF)
Investigator Initiated Research Grant
Title: "A New Paradigm: Cadaveric Collateral Ligament for Hand Reconstruction"
Role: Co-Principal Investigator

11/2019-10/2020
Misonix, Inc. Investigator Initiated Research Grant
Title: "Effects of Temperature of Surrounding Issues with Use of Misonix Drill Compared to Midas Rex-8 Drill"
Role: Co-Investigator

12/2019-11/2020
Arthrex Investigator Initiated Research Grant
Title: "Biomechanical Comparison of Ulnar Collateral Ligament Reconstruction with and without Internal Bracing"
Role: Co-Principal Investigator

Pending Grants:

R03
NIH/ Musculoskeletal, Oral and Skin Sciences (MOSS)
Title: 3D printable neural crest-derived stem cells in bio-ink for cranial bone regeneration
SPONSOR: NIH
Role: co-I (PI: D. Sheyn)

Medtronic Research Grant
Title: “Biomechanical Evaluation of a Novel C2 Terminus for Occipitocervical Fusion "
Role: Co-Principle Investigator (PI: T. Perry)

Arthrex Investigator Initiated Research Grant
Title: “Quantifying Visualization Using NanoScope in Wrist and Elbow Arthroscopy”
Role: Co-Principal Investigator

R01
NIH/National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS)
Title: Studying the Mechanism of Discogenic Low Back Pain Using NP-Nociception-Chip System
Role: Co-Investigator (PI: D. Sheyn)

Intuitive Foundation in Training and Human Performance
Title: Ergonomics Training in Robotic Surgery
Role: Co-Investigator (PI: M. Jain)

INVITED LECTURES AND PRESENTATIONS:

1. **Metzger, M.F.,** Biomechanics of Posterior Non-Fusion Devices, 9th Annual Symposium on Current Concepts in Spinal Disorders, Las Vegas, NV February 2010.
2. **Metzger, M.F.,** Biomechanics of Lumbar ADR, 9th Annual Symposium on Current Concepts in Spinal Disorders, Las Vegas, NV February 2010.
3. **Metzger, M.F.,** Biomechanics of Cervical ADR, 9th Annual Symposium on Current Concepts in Spinal Disorders, Las Vegas, NV February 2010.
4. **Metzger, M.F.,** "Biomechanical Challenges at Lumbosacral Junction: Motion Preservation vs. Fusion", 12th Annual Symposium on Current Concepts in Spinal Disorders, Las Vegas, NV February 2013.
5. **Metzger, M.F.** “Orthopaedic Biomechanics: Applying Principles of Mechanics to the Human Body”, 2013 Engineer's Week, Department of Mechanical Engineering, Cal State University Northridge, CA, February 22nd, 2013.
6. **Metzger, M.F.,** “Vitamin D and Spinal Fusion", Spine Division Neurosciences Department, University of Southern California, Los Angeles, CA, May 24th, 2013.
7. **Metzger, M.F.,** "The Relationship between Serum Vitamin D Status and Successful Spinal Fusion", 13th Annual Symposium on Current Concepts in Spinal Disorders, Las Vegas, NV February 2014.
8. **Metzger, M.F**., Williams JR, Ngai V, Albert CA, Resolving Conflicting Testimony through Biomechanics, Webinar, Robson Forensic, November 19th, 2020.
9. **Metzger M.F.**, “Using Mixed Reality to Reduce Fatigue-Related Injuries”, Dance and the Pandemic: A Dance Medicine Outreach Webinar, April 17th, 2021.

TEACHING ACTIVITIES:

2000-2001	Organic Chemistry tutor, UC Berkeley
2007	Graduate Student Instructor, Bioengineering 10: Introduction to Biomedicine
2010-2012	Didactic Lecture for Cedars-Sinai Spine Fellows
2014-2017	Didactic Lecture on Biomechanics and Biomaterials for Residents
2015	Dissertation committee for Cesar Lopez, "Composite Mechanics of Annulus Fibrosus of Intervertebral Disc", CSUN Mechanical Engineering
2016-	Monthly Cadaveric Dissection Skills Lab for Residents and Fellows
2020-	Kerlan Jobe Didactic Lecture

Non-Clinical Teaching

1. **Metzger, M.F.** "Spine Center Research Core Lecture", Spine Center Grand Rounds, Cedars-Sinai Medical Center, Los Angeles, CA, May 9th, 2012.
2. **Metzger, M.F.** "The Biomechanics Lab at Cedars-Sinai", Orthopaedic Surgery Grand Rounds, Cedars-Sinai Medical Center, Los Angeles, CA, September 19th, 2012.
3. **Metzger, M.F**. "The Influence of Vitamin D on Spinal Surgery", Japanese Orthopaedic Association Traveling Fellows Conference, Orthopaedic Department at Cedars-Sinai Medical Center, Los Angeles, CA, June 20th, 2013.
4. **Metzger, M.F**. "Research at Its Finest", Spine Center Grand Rounds, Cedars-Sinai Medical Center, Los Angeles, CA, January 14th, 2015.
5. **Metzger, M.F**. "Grant Writing Skills", Resident Skills Training Workshop, Cedars-Sinai Medical Center, Los Angeles, CA September 27th, 2016.
6. **Metzger, M.F**. "Distinguished Women in Science", Association of Women in Science, Cedars-Sinai Medical Center, Los Angeles, CA, March 14th, 2017.
7. **Metzger, M.F**. "Head, Shoulders, Knees and Toes: An Overview of CSMC's Orthopaedic Biomechanics Lab", ORS Southern California Regional Symposium: Orthopaedic Research: From Mechanism to Mechanics, Cedars-Sinai Medical Center, Los Angeles, CA, September 25th, 2017.
8. **Metzger, M.F**., "Head, Shoulders, Knees and Toes: Orthopaedic Biomechanics at CSMC", BASSST Seminar Series, Cedars- Sinai Medical Center, Los Angeles, CA, October 4th, 2017
9. **Metzger, M.F.**, "The effect of Type II Diabetes on Bone Growth and Metabolism after Spinal Fusion Surgery" Spine Center Grand Rounds, Cedars-Sinai Medical Center, Los Angeles, CA, March 13th, 2018.
10. **Metzger, M.F.** "The Biomechanics of Dance: A Review", Cedars-Sinai/USC Glorya Kaufman Dance Medicine Center Symposium on The Hybrid Dancer: Care and Prevention of Dance Injuries, Cedars-Sinai Medical Center, Los Angeles, CA, April 7th, 2018.
11. **Metzger, M.F**. "The Biomechanics of Jumps and Landings", Lecture presentation to students in DANC105: Dance Science at USC Glorya Kaufman Dance Medicine Center, Los Angeles, CA, February 28th, 2019.
12. **Metzger, M.F**, Sheyn D. "The Effect of Diabetes Mellitus on Musculoskeletal Tissues" EM/DORI Research Seminar Series, Cedars-Sinai Medical Center, October 18th, 2019

13. **Metzger, M.F**. "Biomechanical Analysis Strategies Toward Improved Clinical Outcomes" Grand Rounds, Department of Orthopaedic Surgery, Cedars-Sinai Medical Center, January 8th, 2020.
14. **Metzger, M.F**. "Sex Differences in How We Connect…To Our Bones" CREWHS (Center for Research in Women's Health and Sex Differences) Research Scientists Seminar Series, Cedars-Sinai Medical Center, April 17th, 2020.
15. **Metzger M.F.** and Orr Limpisvasti, 'Introduction to Sports Medicine Research', Cedars-Sinai Kerlan Jobe Didactic Curriculum, August 14th, 2020

Mentorship

High School, Undergraduate, Graduate and Medical Students:

2009 Cory Laws
University of California, San Francisco, Graduate Student

2014 Mark Svet, CSMC Research Internship Program
University of California, Los Angeles undergraduate

2015 Chris Lama, CSMC Research Internship Program,
University of California, Los Angeles undergraduate

2016 Rishi Trikha, CSMC Summer Research Internship Program
Icahn School of Medicine at Mount Sinai, medical student
Landon Polakof, CSMC Research Internship Program
Wright State University, medical student
Vivian Xu, CSMC Research Internship Program
Penn State undergraduate

2017 Madeleine Kilimnik, CSMC Summer Research Internship Program
Penn State undergraduate
Myriam Navarro, CSMC Research Internship Program
University of California, Los Angeles undergraduate
Lily Turner, CSMC Research Internship Program
University of Southern California undergraduate

2018 Katherine Samuel, CSMC Minors in Research Program
Campbell Hall High school

2019 Nathalie Pham, Biomedical Education Pipeline Initiative
University of California, Los Angeles undergraduate
Alexander Breda, CSMC Research Internship Program
Westminster College in Salt Lake, Utah

2021 Gian Christian Ignacio
Brown University, Providence, Rhode Island

Residents and Fellows:

2015 Neil Bhamb, CSMC Orthopaedic Resident
Tyler Welch, CSMC Kerlan-Jobe Fellowship Program
Alexander Tuchman, USC Neurosurgery Resident

2016 Alisa Alayan, CSMC Orthopaedic Resident
Max Michalski, CSMC Orthopaedic Resident
Sean Rajee, CSMC Orthopaedic Resident
Natasha Trentacosta, CSMC Kerlan-Jobe Fellowship Program

2017 Danielle Thomas, CSMC Orthopaedic Resident
Zach NaPier, CSMC Orthopaedic Resident
Matt Zapf, CSMC Orthopaedic Resident
John Garlich, CSMC Orthopaedic Resident
Erin Haggerty, CSMC Orthopaedic Resident
Tyler Gonzalez, CSMC Foot and Ankle Orthopaedic Fellow

2018 Tonya An, CSMC Orthopaedic Resident
Dan Howard, CSMC Kerlan-Jobe Fellowship Program
John Grotting, CSMC Kerlan-Jobe Fellowship Program
Jorge Chahla, CSMC Kerlan-Jobe Fellowship Program
Pascual Dutton, CSMC Kerlan-Jobe Fellowship Program

2019 Nelson Mead, CSMC Kerlan-Jobe Fellowship Program
Frank Wydra, CSMC Kerlan-Jobe Fellowship Program
Lionel Lazaro, CSMC Kerlan-Jobe Fellowship Program
Daniel Lim, CSMC Kerlan-Jobe Fellowship Program
William Uffmann, CSMC Kerlan-Jobe Fellowship Program
Scott Anderson, CSMC Kerlan-Jobe Fellowship Program
Max Michalski, CSMC Orthopaedic Resident
Johnny Wang, CSMC Orthopaedic Resident
Lee Haruno, CSMC Orthopaedic Resident

2020 Stephen Torres, CSMC Kerlan-Jobe Fellowship Program
Mike Narvaez, CSMC Kerlan-Jobe Fellowship Program
Mike Perrone, CSMC Kerlan-Jobe Fellowship Program
Matt Hamula, CSMC Kerlan-Jobe Fellowship Program
Justin Cohen, CSMC Neurosurgery Fellowship Program
Michael Sun, CSMC Orthopaedic Resident
Ali Noorzad, CSMC Orthopaedic Resident
Lee Haruno, CSMC Orthopaedic Resident

2021 David Maldonado, CSMC Kerlan-Jobe Fellowship Program
Shrey Kanjiya, CSMC Kerlan-Jobe Fellowship Program
Raj Yalamanchili, CSMC Kerlan-Jobe Fellowship Program
Tennyson Block, CSMC Orthopaedic Hand Fellow

BIBLIOGRAPHY/PUBLICATIONS:

A.) Research Papers – Peer-Reviewed

1. **Metzger MF**., D. Schumann, T.S. Wilson, D.L. Matthews, and D.J. Maitland," Mechanical Properties of a Mechanical Actuator for Treating Ischemic Stroke", Journal of Biomedical Microdevices 4(2):89-96 (2002)
2. Maitland, D.J., **Metzger M.F**., D. Schumann, T.S. Wilson, A. Lee, and D.L. Matthews, "Photothermal Properties of Laser-Activated Shape Memory Polymer Microactuators for Treating Stroke," Lasers in Surgery and Medicine 30:1-11(2002)
3. Suhadolnik, R.J., Peterson D.L., Reichenbach, N.L., Roen G., **Metzger M.F**., McCahan J., O'Brien K., Welsch S., Gaughan, J.P, McGregor, N.R, "Clinical and Biochemical Characteristics Differentiating Chronic Fatigue Syndrome from Major Depression and Healthy Control Populations: Relation to Dysfunction of RNase L Pathway", Journal of Chronic Fatigue Syndrome (2004)
4. Small, W., IV, **Metzger, M.F**., Wilson, T.S., Maitland, D.J., "Laser-activated shape memory polymer microactuator for thrombus removal following ischemic stroke: preliminary in vitro analysis" IEEE Journal of Selected Topics in Quantum Electronics 11(4):892-901 (2005)
5. O'Reilly, OM, **Metzger MF**, Buckley JP, Moody DA, Lotz JC, "On the Stiffness Matrix of the Intervertebral Joint: Application to Total Disc Replacement" ASME Journal of Biomechanical Engineering, 131(8):63-87 (2009)
6. **Metzger MF**, Faruk Senan N.A., O'Reilly O.M., "On Cartesian Stiffness Matrices in Rigid Body Dynamics: An Energetic Perspective", Journal of Multibody System Dynamics, 24(4):441–472 (2010)
7. **Metzger MF**, Faruk Senan N.A., O'Reilly O.M., Lotz J.C., "Minimizing Errors Associated with Calculating the Helical Axis of Spinal Motion", Journal of Biomechanics 43(14):2822-2829 (2010)
8. Kennedy A., Coughlin D.G., **Metzger M.F**., Pearle A.D., Lotz J.C., Feeley B.T., "Biomechanical Evaluation of Pediatric ACL Reconstruction Techniques", The American Journal of Sports Medicine 39(5):964-71 (2011).
9. **Metzger MF**, L.E.A. Kanim, L. Zhao, S.T. Robinson, R.B. Delamarter."The Relationship between Vitamin D Status and Successful Spinal Fusion" The Spine Journal 13(9): S53 (2013)
10. Robinson ST, Svet MT, **Metzger MF**, "Four-Point Bending as a Method for Quantitatively Evaluating Spinal Arthrodesis in a Rat Model", Journal of Comparative Medicine 65(1):46-50 (2015)
11. **Metzger MF**, L.E.A. Kanim, L. Zhao, S.T. Robinson, R.B. Delamarter. "The Relationship between Serum Vitamin D Levels and Spinal Fusion Success: A Quantitative Analysis", Spine 40(8): E458-68 (2015).
12. **Metzger MF**, S.T. Robinson, M.T. Svet, J.C. Liu, F.L. Acosta, "Biomechanical Analysis of the Proximal Adjacent Segment after Multi-Level Instrumentation of the Thoracic Spine: Do Hooks Ease the Transition?", Global Spine Journal 6(4): 335-343 (2016).
13. Tuchman A, Turner A, **Metzger MF**, Acosta FL. "An in Vitro Biomechanical Model of Differing Pedicle Screw Configurations for Long Construct Segmental Thoracic Fixation", Operative Neurosurgery, 0:1–6, doi: 10.1093/ons/opx051 (2017).

14. Arunakul R, **Metzger MF**, Kanim LEA, Bae H, Kropf M, Delamarter D. "Radiographic Analysis of the Lumbosacral Juncture: Is There a Critial Sacral Angle for Total Disc Replacement?" Asian Spine Journal, (2):249-255. doi: 10.4184/asj.2017.11.2.249. (2017).
15. **Metzger MF**, Robinson ST, Maldonado R, Rawlinson JJ, Liu JC, Acosta FL, " Biomechanical analysis of lateral interbody fusion strategies for adjacent segment degeneration in the lumbar spine". Spine J. 2017 Jul;17(7):1004-1011. doi: 10.1016/j.spinee.2017.03.00 (2017)
16. Welch T, Mohr K, Keller T, **Metzger MF**, Maldonado R, Kvitne R., "The Effect of a Dynamic PCL Brace on Patellofemoral Compartment Pressures in PCL- and PCL/PLC-Deficient Knees", Journal of Experimental Orthopaedics, Dec;4(1):10 (2017)
17. Trentacosta N, Pace JL, **Metzger MF**, Michalski M, Nelson T, Polakof L, Mandelbaum B, "Biomechanical Evaluation of Pediatric Anterior Cruciate Ligament (ACL) Techniques with and without the Anterolateral Ligament (ALL)". J Pediatr Orthop, Oct 23 2017. DOI: 10.1097/BPO.0000000000001078 (2017)
18. Bhamb N, Kanim L, Maldonado R, Svet M, **Metzger MF**, "Effect of modulating dietary vitamin D on the general bone health of rats during posterolateral spinal fusion. J Orthop Res. 2017 Dec 20. doi: 10.1002/jor.23832 (2017)
19. Kremen TJ, Polakof LS, Rajee S, Nelson TJ, **Metzger MF**, "The Effect of Hamstring Tendon Autograft Harvest on the Restoration of Knee Stability in the Setting of Concurrent Anterior Cruciate Ligament and Medial Collateral Ligament Injuries", Am J Sports Med., Jan;46(1):163-170 (2018)
20. Alayan A, Maldonado RC, Polakof L, **Metzger MF**, Saini A, Lin C, Moon C. "Biomechanical Analysis of a Novel Buried Fixation Technique Using Headless Compression Screws". Am J Orthop. 47(7); (2018).
21. Pfeffer GB, Gonzalez TA, Zapf M, Nelson TJ, **Metzger MF**. "Postoperative Achilles Pull-out Strength after Open Calcaneoplasty for Haglund's Syndrome". Foot Ankle Int. Aug;39(8):966-969. doi: 10.1177/1071100718770391. PMID: 29652192 (2018)
22. Bhamb N, Kanim LEA, Maldonado RC, Nelson TJ, Salehi K, Glaeser JD, **Metzger MF**. "The Impact of Type 2 Diabetes on Bone Metabolism and Growth after Spinal Fusion". Spine J Jun;19(6):1085-1093, DOI: 10.1016/j.spinee.2018.12.003 (2019).
23. Michalski MP, Gonzalez TA, **Metzger MF**, Nelson TJ, Eberlein SA, Pfeffer GB. "A Biomechanical Comparison of Achilles Tendon Pullout Strength Following Midline Tendon-Splitting and Endoscopic Approaches for Calcaneoplasty". Foot Ankle Int. Jun 17:1071100719856939. doi: 10.1177/1071100719856939 PMID: 31203670 (2019).
24. Thomas D, Thordarson D, Nelson TJ, Timothy CP, Eberlein S, **Metzger, MF**. "Biomechanical Impact of FHL Tendon Harvest on Forefoot and Great Toe Push-Off Strength and its Correlation to Knot of Henry Crossover *Variatio*n". Foot Ankle Int. Sep 14:1071100719875229. doi: 10.1177/107110071987522 (2019).
25. Dutton P, Banffy M, Nelson TJ, **Metzger MF.** "Anatomic and Biomechanical Evaluation of Ulnar Tunnel Position in Medial Ulnar Collateral Ligament Reconstruction", Am J Sports Med 47(14):3491–3497 https://doi.org/10.1177/0363546519880182, (2019)
26. Garlich J, Samuel K, Nelson TJ, Monfiston CH, Kremen TJ, **Metzger MF**, Little M. "Infraspinatus Tenotomy Improves Glenoid Visualization with The Modified Judet Approach", J Orthop Trauma, Oct 7. doi: 10.1097/BOT.0000000000001659 (2019)

27. Chahla J, Nelson TJ, Dallo I, Yalamanchili R, Eberlein SA, Limpisvasti O, Mandelbaum B, **Metzger MF**. "Anterior Cruciate Ligament Repair versus Reconstruction: A Biomechanical Analysis" The Knee, In Press. https://doi.org/10.1016/j.knee.2019.10.020 (2019)

28. NaPier Z, Kanim LEA, Nelson TJ, Salehi K, Arabi Y, Glaeser JD, Dmitriy Sheyn D, **Metzger MF**. "Spinal Fusion is Inhibited in an Insulin Dependent Diabetes Rat Model", Spine J, 10.1016/j.spinee.2019.11.011 (2019)

29. Chahla J, Papalamprou A, Khnkoyan Z, Arabi Y, Chan V, Salehi K, Nelson TJ, Limpisvasti O, Mandelbaum BR, **Metzger MF**, Sheyn D. "Assessing the Resident Progenitor Cell Population and the Vascularity of the Adult Human Meniscus", *Arthroscopy* 37(1): 252-265 (2020).

30. Glaeser J, Salehi K, Kanim L, Ju D, Hyuk J, Behrens P, Eberlein S, **Metzger MF**, Arabi Y, Stefanovic T, Sheyn D, Bae H. "Electrospun, synthetic bone void filler promotes human MSC function and BMP-2 mediated spinal fusion" *J Biomater Appl*;35(4-5):532-543. doi: 10.1177/0885328220937999 (2020).

31. Pfeffer G, Michalski M, Nelson TJ, An T, **Metzger MF**. "Biomechanical Evaluation of Extensor Tendon Transfers for Treatment of Foot Drop in Charcot-Marie-Tooth Disease" Foot Ankle Int; 41(4) :449-456 doi: 10.1177/1071100719901119. (2020).

32. Grotting JA, Nelson TJ, Banffy MB, Yalamanchili R, Eberlein SA, Chahla J, **Metzger MF**. "Biomechanical Evaluation of PCL Reconstruction with Suture Augmentation" *The Knee*, https://doi.org/10.1016/j.knee.2020.01.004 (2020).

33. Garlich J, Little M, Nelson TJ, Eberlein SA, Monfiston CH, **Metzger MF**. "A Comparison of 3 Fixation Strategies in the Treatment of Neer Type IIB Distal Clavicle Fractures", J Orthop Trauma; 34(8):e266-e271. doi: 10.1097/BOT.0000000000001752 (2020).

34. Kremen TJ, Haggerty E, Eberlein SA, Chahla J, Nelson TJ, Schroeder G**, Metzger MF**. "Comparative Analysis of Sagittal-Plane Radiographic Landmarks Used to Identify the Femoral Attachments of Lateral Knee Structures." *Arthroscopy* 36(11):2888-2896. doi: 10.1016/j.arthro.2020.07.006 (2020).

35. Uffmann W, ElAttrache N, Nelson TJ, Eberlein SA, Wang J, Howard DR, **Metzger MF**. "Posterior Lateral Meniscal Root Tears Increase Strain on the Reconstructed Anterior Cruciate Ligament: A Cadaveric Study", Arthroscopy, Sports Medicine, and Rehabilitation https://doi.org/10.1016/j.asmr.2020.11.005 (2021).

36. Kremen TJ, Monifiston CH, Garlich J, Little M, **Metzger MF**. "Characterization of A Better Understanding of Infraspinatus Tendon Characteristics Anatomy: The Soft-Tissue Portion of Remplissage" *Arthroscopy, Sports Medicine, and Rehabilitation (ASMAR)*; 3(3):741-748, https://doi.org/10.1016/j.asmr.2021.01.013 (2021).

37. Perrone MO, Noorzad A, Hamula M, **Metzger MF**, Banffy M, Gerhardt M. "Hip Adductor Longus Tendon Origin Anatomy is Consistent and may Inform Surgical Reattachment", *Arthroscopy, Sports Medicine, and Rehabilitation (ASMAR)* 3(1): E227-E232, https://doi.org/10.1016/j.asmr.2020.09.015 (2021).

38. Glaeser JD, Behrens P, Stefanovic T, Salehi K, Papalamprou A, Tawackoli W, **Metzger MF,** Eberlein S, Nelson TJ, Arabi Y, Kim K, Baloh R, Ben-David S,Cohn-Schwartz D, Ryu R, Bae HW, Gazit Z, Sheyn D. "Neural Crest-derived MSCs Enhance Cranial Allograft Integration" STEM CELLS Transl Med. 2020;1–13 https://doi.org/10.1002/sctm.20-0364 (2020).

39. Glaeser JD, Ju D, Tawackoli W, Yang JH, Salehi K, Stefanovic T, Kanim LEA, Avalos P, Kaneda G, Stephan S, **Metzger MF**, Bae HW, and Dmitriy Sheyn D. "Advanced glycation end

product inhibitor pyridoxamine attenuates IVD degeneration in type 2 diabetic rats" Int J Mol Sci 21(24):9709 (2020).

B.) Research Papers– Peer-Reviewed (In Press)

1. Wydra FB, Al'Khafaji I, Haruno L, Chahla J, Nelson TJ, Gerhardt MB, **Metzger MF**. "Hip Capsular Management with Pie-Crusting Technique: A Biomechanical Comparison to the T-Capsulotomy" In Press. Arthroscopy https://doi.org/10.1016/j.arthro.2021.03.044. March, 2021.
2. Lazaro LE, Lim DP, Nelson TJ, Eberlein SA, Banffy MB, **Metzger MF**., "Proximal Over-resection During Femoral Osteochondroplasty Negatively Affects the Distractive Stability of the Hip Joint" Accepted to AJSM March 2021.
3. Mead N, Limpisvasti O, Nelson TJ, **Metzger MF**. " Biomechanical Evaluation of UCL Repair Using Suspensory Fixation" Accepted to the O J Sports Med May 2021.

C.) Research Papers - Peer-Reviewed (Submitted)

1. Hamula MJ, Perrone M, Noorzad A, Uffmann W, **Metzger MF**, Banffy M. "Does Fluoroscopic Guidance with Current Arthroscopic Techniques Predictably Avoid Iatrogenic Labral Penetration and Femoral Head Scuffing in Hip Arthroscopy? A CT Correlation on the Safe Establishment of the Anterolateral Portal." Submitted to ASMAR April, 2021.
2. Lim DP, Kyhos J, Lazaro LE, Nelson TJ, Eberlein SA, Banffy MB, **Metzger MF**., "Abductor Muscles Increase Hip Stability Against Rotational and Distractive Forces" Submitted to Hip Preservation, June 2021.
3. Torres SJ, Limpisvasti O, Uffmann W, Nelson TJ, Pham N, **Metzger MF**., "Suture Tape Augmentation Increases the Immediate Post-Operative Stiffness and Strength of ACL Grafts" Submitted to OJSM June 2021.
4. Narvaez MV, Nelson TJ, Youssefzadeh K, Limpisvasti O, **Metzger MF**., "Biomechanical Comparison of Ulnar Collateral Ligament Reconstruction with and without Internal Bracing" Submitted to AJSM June 2021.

Letters to the Editor:

1. Michalski MP, Gonzalez TA, **Metzger MF**, Nelson TJ, Eberlein SA, Pfeffer GB. Response to "Letter Regarding: Biomechanical Comparison of Achilles Tendon Pullout Strength Following Midline Tendon-Splitting and Endoscopic Approaches for Calcaneoplasty" Foot Ankle Int Jul;41(7):887-888.doi: 10.1177/1071100720929345 (2020)

Papers in Preparation (Research Completed):

1. Maldonado D, Banffy M, Huang D, Nelson TJ, Metzger MF. "Hip Capsular Closure Following T-Type Capsulotomy. A Biomechanical Analysis of the Figure of Eight Versus Simple Suture Configuration" Will be submitted to AJSM June 2021.
2. Block T, Kulber D, Nelson TJ, Sun M, An T, Yoshida R, **Metzger MF**. "Hand Ligament Reconstruction with Knee Collateral Ligament Allograft vs Tendon Autograft" Will be submitted to the Journal of Hand Surgery July 2021.
3. Maldonado D, Banffy M, Huang D, Nelson TJ, Metzger MF. "Hip Capsular Closure Following T-Type Capsulotomy. A Biomechanical Analysis of the Figure of Eight Versus Simple Suture Configuration" Will be submitted to AJSM June 2021.

Abstracts:

1. **Metzger, M.F.**, D. Schumann, T.S. Wilson, D.L. Matthews, and D.J. Maitland, "Mechanical Properties of a Mechanical Actuator for Treating Ischemic Stroke", Annual American Society for Laser Medicine and Surgery Meeting, New Orleans, Louisiana, April 2001.
2. **Metzger M.F.**, Buckley J.M., O'Reilly O.M., Lotz J.C. "A Novel Method for Measuring In Situ Structural Rigidity of Total Disc Replacement Systems", Spine Arthroplasty Society 7th Annual Meeting, Berlin, Germany, May 2007.
3. Buckley J.M., **Metzger M.F.**, Bradford, D.S., Lotz J.C., O'Reilly O.M., "How Accurately can we Measure the Instantaneous Axis of Rotation?" Spine Arthroplasty Society 7th Annual Meeting, Berlin, Germany, May 2007.
4. **Metzger M.F**., Buckley J.M., Acosta F.L., O'Reilly O.M., Lotz J.C., "Facet Force Sensitivity to Total Disc Replacement Device Position", Orthopaedic Research Society 54th Annual Meeting, San Francisco, CA, March 2008.
5. **Metzger M.F**., Buckley J.M., Acosta F.L., Lotz J.C., "A Simplified Method for Comparing 3D Quality of Motion in Vitro", Spine Arthroplasty Society 8th Annual Meeting, Miami, FL, May 2008.
6. **Metzger M.F**., Senan A.F., Lotz, J.C., O'Reilly, O.M., "Revisiting the Stiffness Matrix with an Application to Total Disc Replacement Systems', North American Spine Society 23rd Annual Meeting, Montreal, Ontario, October 2008.
7. **Metzger M.F**., Bradford D.S., Lotz, J.C., "First Generation TDR Devices Do Not Adequately Resist Shear in the Lumbosacral Spine", Spine Arthroplasty Society 9th Annual Meeting, London, England, May 2009.
8. **Metzger, M.F**., Faruk Senan, N.A., O'Reilly O.M., Lotz, J.C., "Minimizing Errors Associated with Calculating the Helical Axis of Spinal Motion", Orthopaedic Research Society 56th Annual Meeting, New Orleans, LA, March 2010
9. Marshall, D.C., **Metzger, M.F**., Bae, H.W., Zhao, L., Kanim, L.E.A, Wong, P., Delamarter, R.B., "Bone Marrow Aspirate with a Subeffective Dose of rhBMP-2 in Spinal Fusion: A Quantitative Analysis", Orthopaedic Research Society 58th Annual Meeting, San Francisco, CA, March 2012.
10. F.L. Acosta, Jr., Z. Buser, Y. Safai, **M.F. Metzger**, R.B. Delamarter. "Improving Bone Formation in Osteoporosis through Mechanical Signaling Pathways." SRS Annual Meeting, September 2012.
11. **M.F. Metzger**, L.A. Kanim, L. Zhao, S.T. Robinson, Buser, Z., R.B., Delamarter. "The Relationship between Serum Vitamin D levels, Successful Fusion and Fusion Strength: A Quantitative Analysis" Orthopaedic Research Society 59th Annual Meeting, San Antonio, TX, January 2013.
12. S.T. Robinson, R.B. Delamarter, M.T. Svet, **M.F. Metzger**. "Does Sacral Geometry Affect Biomechanical Behavior and Facet Forces after Total Disc Replacement at the Lumbosacral Junction?" The International Society for the Advancement of Spine Surgery (ISASS) Annual Meeting, Vancouver BC, April 2013.
13. **Metzger, M.F.**, Kanim, L.A., Zhao, L., Robinson, S.T., Delamarter, R.B. "Suboptimal Vitamin D Increases Risk for Infection", ISSLS 40th Annual Meeting, Scottsdale, Arizona, May 13-17, 2013.
14. **Metzger, M.F**., Kanim, L.A., Zhao, L., Robinson, S.T., Delamarter, R.B. "The Relationship between Vitamin D Status and Successful Fusion", ISSLS 40th Annual Meeting, Scottsdale, Arizona, May 13-17, 2013.
15. **Metzger, M.F.,** Robinson, S.T., Drazin, D., Svet, M.T., Acosta, F.L. " Biomechanical Analysis of the Proximal Adjacent Segment after Scoliosis Correction: Do Hooks Ease the Transition?" 20th International Meeting on Advanced Spine Techniques (IMAST), Vancouver, British Columbia, Canada July 10-13, 2013.

16. **Metzger, M.F.,** Kanim, L.A., Zhao, L., Robinson, S.T., Delamarter, R.B. "The Relationship between Serum Vitamin D Levels, Successful Fusion and Fusion Strength: A Quantitative Analysis", SRS 48th Annual Meeting, Lyon, France, September 18-21, 2013.
    - Hibbs Basic Science Award Nominees
17. **Metzger, M.F.,** Kanim, L.A., Zhao, L., Robinson, S.T., Delamarter, R.B. "The Relationship Between Vitamin D Status and Successful Spinal Fusion", NASS 28th Annual Meeting, New Orleans, October 9-11th, 2013
    - Best Papers Section
    - Under consideration for Value Abstract Award
18. **Metzger, M.F.,** Robinson, S.T., Maldonado R., Delamarter, R.B., Liu, J., Acosta F., "Biomechanical Analysis of Direct Lateral Interbody Fusion (DLIF): Strategies for Adjacent Segment Degeneration in the Lumbar Spine", Congress of Neurological Surgeons Annual Meeting, Boston, MA, October 2014.
19. **Metzger, M.F.,** Robinson, S.T., Maldonado R., Rawlinson, J.J., Liu, J., Acosta F.L., "Direct Lateral Interbody Fusion (DLIF) Strategies for Adjacent Segment Degeneration in the Lumbar Spine, a Biomechanical Analysis" The International Society for the Advancement of Spine Surgery (ISASS) Annual Meeting, San Diego, CA, April 2015.
20. Welch T., Mohr K., Keller T., **Metzger M.F**, Maldonado R., Kvitne R., "The Effect of Dynamic Bracing on Patellofemoral Joint Pressures in PCL- and PCL/PLC-Deficient Knees" The American Orthopaedic Society for Sports Medicine (AOSSM) Annual Meeting, Orlando, FL, July 2015.
21. Maldonado R, Kanim LEA, Svet MT, **Metzger MF,** "Interrelationships of Vitamin D Status, Bone Health and Fusion Consolidation", NASS 30th Annual Meeting, Chicago, IL, October 2015.
22. Tuchman A., Turner AW, **Metzger MF**, Acosta F. "An In Vitro Biomechanical Model of Segmental Thoracic Fixation for Spinal Deformity Correction", Spine Summit 2016: The 32nd Annual Meeting of the Section on Disorders of the Spine and Peripheral Nerves, Orlando, FL, March, 2016
    - The Charlie Kuntz Scholars Award (awarded to top 10 residents)
23. Bhamb N, Maldonado R, Kanim LEA, Svet MT, **Metzger MF**, "Effect of Modulating Dietary Vitamin D on the General Bone Health of Rats During Posterolateral Spinal Fusion" California Orthopaedic Association's 2016 Annual Meeting, May, 2016, Dana Point, CA
    - Winner of the OREF Resident Award
24. Xu, V, Nelson TJ, Maldonado RC, Bhamb N, Kanim, LEA, **Metzger, MF**. "The Impact of Type 2 Diabetes on Bone Metabolism and Growth after Spinal Fusion: Radiographic Analysis" Cedars-Sinai Research Internship Program Poster Day, Los Angeles, CA, August 5th, 2016.
    - Placed as a Finalist in poster competition
25. Alayan A, Maldonado RC, Polakof L, **Metzger MF**, Saini A, Lin C, Moon C. "Biomechanical Analysis of a Novel Buried Fixation Technique Using Headless Compression Screws" Western Orthopaedic Association's 2016 Annual Meeting, September 2016, Indian Wells, CA
26. Trentacosta N, Pace JL, **Metzger MF**, Michalski M, Nelson T, Polakof L, Mandelbaum B. "Biomechanical Evaluation of Pediatric Anterior Cruciate Ligament (ACL) Techniques with and without the Anterolateral Ligament (ALL)". Pediatric Research in Sports Medicine Society 4th Annual Meeting, January 2017, Dallas, TX.
27. Kremen TJ, Polakof L, Rajee S, Nelson T, **Metzger MF**. "The effect of Hamstring Tendon Autograft Harvest on the Restoration of Knee Stability in the Setting of Anterior Cruciate Ligament Rupture

and Concurrent Medial Collateral Ligament Injury". AOSSM Annual Meeting, Toronto, Canada, July 2017.

28. Pace JL, Trentacosta NE, **Metzger MF**, Nelson T, Michalski M, Polakof LS, Mandelbaum BR. "Biomechanical Evaluation of Pediatric Anterior Cruciate Ligament Reconstruction Techniques with and without the Anterolateral Ligament" AOSSM Annual Meeting, Toronto, Canada, July 2017.
29. Kremen TJ, Polakof LS, Rajee S, Nelson TJ, **Metzger MF**. "The effect of Hamstring Tendon Autograft Harvest on the Restoration of Knee Stability in the Setting of Anterior Cruciate Ligament Rupture and Concurrent Medial Collateral Ligament Injury". Western Orthopaedic Association (WOA) 81st Annual Meeting, Koloa, Hawaii, August 2017.
    - Recipient of the Young Investigator Award
30. Bhamb N, Kanim LEA, Maldonado RC, Nelson TJ, Glaeser J, Salehi K, **Metzger MF**. "The Impact of Type 2 Diabetes on Bone Metabolism and Growth after Spinal Fusion". North American Spine Society Annual Meeting, Orlando, FL, October 2017.
31. Thomas D, Thordarson D, Nelson TJ, Timothy CP, Eberlein S, **Metzger, MF**. "Biomechanical Impact of FHL Tendon Harvest on Forefoot and Great Toe Push-Off Strength and its Correlation to Knot of Henry Crossover Variation". American Orthopaedic Foot & Ankle Society (AOFAS) Annual Meeting, Boston, MA, July 2018.
32. Monfiston CH, Garlich J, Mason BS, Little MT, **Metzger MF**, Kremen TJ. "When is a Hills-Sachs Lesion Too Large for Remplissage? The Relationship Between Humeral Head Size and Infraspinatus Tendon Length" Nth Dimension and AAOS Summer Internship Program's Research presentations at the NMA Annual Convention, Orlando, FL, August 2018.
33. K Samuel, Garlich J, Nelson TJ, Monfiston CH, Little MT, **Metzger MF**. "Increased Glenoid Exposure After Infraspinatus Tenotomy: A Quantitative Analysis" Cedars-Sinai Research Internship Program Poster Day, Los Angeles, CA, August 3rd, 2018
    - Winner of the Minors in Research Poster Competition
34. Garlich JM, Nelson TJ, K Samuel, Monfiston CH, **Metzger MF**, Little MT., "Infraspinatus Tenotomy Increases Glenoid Exposure with the Modified Judet Approach to the Scapula", Orthopaedic Research Society (ORS) Annual Meeting, Austin TX, February 2019
35. NaPier Z, Kanim LEA, Nelson TJ, Glaeser JD, Salehi K, Sheyn D, **Metzger MF**., "The Impact of Type I Diabetes on Bone Metabolism and Growth after Spinal Fusion", Orthopaedic Research Society (ORS) Annual Meeting, Austin TX, February 2019
36. Papalamprou A, Chahla J, Arabi Y, Chan V, Salehi K, Nelson TJ, Limpisvasti O, Mandelbaum B, **Metzger MF**, Sheyn D. "Revisiting the Vascularity and Resident Stem Cell Population of the Meniscal Avascular Zone" Orthopaedic Research Society (ORS) Annual Meeting, Austin TX, February 2019
37. Garlich J, Little M, Nelson TJ, Eberlein SA, Monfiston CH, **Metzger MF**. "Evaluation of Multiplanar Stability in Neer Type IIB Clavicle Fractures" Orthopaedic Research Society (ORS) Annual Meeting, Austin TX, February 2019
38. Chahla J, Nelson TJ, Dallo I, Yalamanchili R, Eberlein SA, Limpisvasti O, Mandelbaum B, **Metzger MF**. "Anterior Cruciate Ligament Repair versus Reconstruction: A Biomechanical Analysis" Arthroscopy Association of North America (AANA) 2019 Annual Meeting, Orlando, FL, May 2019.
39. Kremen TJ, Monfiston CH, Garlich J, Little MT, **Metzger MF**. "When is a Hill-Sachs Lesion Too Large for Remplissage? The Relationship Between Humeral Head Size and Infraspinatus Tendon

Length" Arthroscopy Association of North America (AANA) 2019 Annual Meeting, Orlando, FL, May 2019

40. Kremen TJ, Eberlein SA, Chahla J, Nelson TJ, Schroeder G, Haggerty E, **Metzger MF.** "How Accurate Are Radiographic Landmarks at Predicting the Location of Lateral Knee Structures?" Arthroscopy Association of North America (AANA) 2019 Annual Meeting, Orlando, FL, May 2019
    - Nominated for the resident research award
41. Papalamprou A, Chahla J, Khnkoyan Z, Arabi Y, Chan V, Salehi K, Nelson TJ, Limpisvasti O, Mandelbaum BR, **Metzger MF** and Sheyn D. Revisiting the Vascularity and Resident Stem Cell Population of the Human Meniscal White-White zone. International Society for Stem Cell Research (ISSCR) Annual Meeting, Los Angeles, CA, June 2019
42. Papalamprou A, Chahla J, Chan V, Limpisvasti O, Mandelbaum BR, **Metzger MF** and Sheyn D. Revisiting the Vascularity and Resident Stem Cell Population of the Meniscal Avascular Zone, ICORS annual meeting, Podium Presentation, Montreal, Canada, June 2019
43. Garlich JM, Nelson TJ, Katherine S, Monfiston CH, **Metzger MF**, Little MT., "Infraspinatus Tenotomy Improves Glenoid Visualization with the Modified Judet Approach", Western Orthopaedic Association (WOA) Annual Meeting, Monterey, CA July 2019
    - Winner of the WOA's David H. Chafey III, MD Donor Award
44. Garlich J, Little M, Nelson TJ, Eberlein SA, Monfiston CH, **Metzger MF**., "Evaluation of Multiplanar Stability in Neer Type IIB Clavicle Fractures", Western Orthopaedic Association (WOA) Annual Meeting, Monterey, CA July 2019
45. Ju DG, Glaeser JD, Salehi K, Kanim LE, Behrens PH, **Metzger MF**, Sheyn D, Bae HW. Electrospun synthetic bone scaffolds promote mesenchymal stem cell function and spinal fusion. 26th International Meeting on Advanced Spine Techniques (IMAST), Amsterdam, NL, July 2019.
    - Whitecloud Award Nominee
46. Pham N, Gonzalez AR, Nelson TJ,Glaeser JD, Suzuki M, Milecamps M, Ohtori S, Stone L, Sheyn D, **Metzger MF.** Exercise Attenuates Age-Related Bone Loss in a Transgenic Mouse Model. Cedars-Sinai Research Internship Program Poster Day, Los Angeles, CA, August 2nd, 2019
47. Garlich JM, Nelson TJ, Katherine S, Monfiston CH, **Metzger MF**, Little MT., "Infraspinatus Tenotomy Increases Glenoid Exposure with the Modified Judet Approach to the Scapula", Orthopaedic Trauma Association (OTA) Annual Meeting, Denver, CO, September 2019
48. Ju DG, Glaeser JD, Salehi K, Kanim LE, Behrens PH, **Metzger MF**, Sheyn D, Bae HW. Electrospun synthetic bone scaffolds promote mesenchymal stem cell function and spinal fusion. 34th Annual Meeting of the North American Spine Society, Chicago, IL September 2019.
49. Lazaro LE, Lim DP, Nelson TJ, Eberlein SA, Banffy MB, **Metzger MF**., "Proximal Over-resection During Femoral Osteochondroplasty Negatively Affects the Distractive Stability of the Hip Joint" International Society for Hip Arthroscopy Annual Scientific Meeting, Madrid Spain, October 2019.
50. Lim DP, Lazaro LE, Nelson TJ, Eberlein SA, Banffy MB, **Metzger MF**., "Abductor Muscles Increase Hip Stability Against Rotational and Distractive Forces: A Quantitative Study" International Society for Hip Arthroscopy Annual Scientific Meeting, Madrid Spain, October 2019
51. Ju DG, Glaeser JD, Salehi K, Kanim LE, Behrens PH, **Metzger MF**, Sheyn D, Bae HW. Electrospun synthetic bone scaffolds promote mesenchymal stem cell function and spinal fusion. 47th Annual Meeting of the Cervical Spine Research Society, New York, NY, November 2019.

52. Lazaro LE, Lim DP, Nelson TJ, Eberlein SA, Banffy MB, **Metzger MF**, "Proximal Over-resection During Femoral Osteochondroplasty Negatively Affects the Distractive Stability of the Hip Joint" AOSSM/AANA 2020 Specialty Day, Orlando, FL, March 2020.
53. Kremen T, Haggerty E, Chahla J, Eberlein S, Nelson T, Schroeder G, **Metzger MF**. "How Accurate Are Radiographic Landmarks at Predicting the Location of Lateral Knee Structures?" AAOS 2020 Annual Meeting, March 2020, Orlando, FL.
54. Uffmann W, ElAttrache N, Nelson TJ, Eberlein SA, Wang J, Howard DR, **Metzger MF**. "Increased Anterior Cruciate Ligament Graft Strain with Lateral Meniscus Posterior Root Tears" Arthroscopy Association of North America (AANA) 2020 Annual Meeting, May 2020, Grapevine, TX.
55. **Metzger MF**, Pham N, Gonzalez AR, Lee S, Suzuki M, Nelson TJ, Glaeser JD, Milecamps M, Stone LS, Sheyn D. "Effects of Exercise and Sparc Knockout on Cranial Bone Structural and Biomechanical Properties", Orthopaedic Research Society (ORS) Annual Meeting, February 2020, Phoenix, AZ.
56. Michalski M, Nelson TJ, An T, Pfeffer G, **Metzger MF**. "Biomechanical Evaluation of Extensor Tendon Transfers for Treatment of Foot Drop in Charcot-Marie-Tooth Disease", Orthopaedic Research Society (ORS) Annual Meeting, February 2020, Phoenix, AZ.
    - Winner of the New Investigator Recognition Award
57. **Metzger MF**, Pham N, Gonzalez AR, Lee S, Miyako Suzuki M, Nelson TJ, Juliane D. Glaeser JD, Milescamp M, Stone LS, Sheyn D. "Sex Differences in Bone Mineralization in an Osteonectin-Deficient Mouse Model of Osteopenia" Specialized Centers of Research Excellence on Sex Differences (SCORE) Annual Meeting December 16-17th, 2020
58. **Metzger MF**, Schimmoeller N, Nelson TJ, Galloway J, Trentacosta N. "Do Oral Contraceptives Protect Against Anterior Cruciate Ligament Injuries in Female Athletes?" Specialized Centers of Research Excellence on Sex Differences (SCORE) Annual Meeting, December 16-17th, 2020.
59. Cohen J, Nelson TJ, **Metzger MF**, Perry T. "Temperature Differences During Laminectomies When Using The Misonix Drill Compared To The Midas-Rex Drill" American Association of Neurological Surgeons (AANS) Annual Scientific Meeting, Orlando, FL, August 21-25, 2021.
60. Nigh ED, Glaeser JD, Behrens PH, Stefanovic T, Salehi K, Papalamprou A, Tawackoli W, **Metzger M**, Eberlein S, Nelson T, Baloh R, Ben-David S, Arabi Y, Cohn-Schwartz D, Ryu RC, Bae HW, Gazit Z, Sheyn D. "Does Origin Matter? Neural Crest-Derived Mesenchymal Stem Cells Enhance Allograft Integration Better than Bone-Marrow-Derived Mesenchymal Stem Cells." Poster Presentation. AAOS Annual Meeting, August 31st - September 3rd, 2021.
61. Narvaez MV, Nelson TJ, Youssefzadeh K, Limpisvasti O, **Metzger MF**., "Biomechanical Comparison of Ulnar Collateral Ligament Reconstruction with and without Internal Bracing" AOSSM Annual Meeting, Nashville, TN, July 7th – 11th, 2021.
    - 2021 Winner of the AOSSM Fellow Research Award for Basic Science
62. Block T, Kulber D, Nelson TJ, Sun M, An T, **Metzger MF**. "Hand Ligament Reconstruction with Knee Collateral Ligament Allograft vs Tendon Autograft" ePoster Presentation. 76th American Society for Surgery of the Hand (ASSH) Annual Meeting, San Francisco, CA, September 30th – October 2nd, 2021.