E. Meade Spratley, Ph.D.

Curriculum Vitae

Biocore, LC
1627 Quail Run
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Education

Doctor of Philosophy, Department of Biomedical Engineering
Virginia Commonwealth University, December 2013
Dissertation – *Patient-Specific Modeling of an Adult Acquired Flatfoot Deformity Cohort Before & After Surgery*

Master of Science, Department of Biomedical Engineering
Virginia Commonwealth University, December 2009
Thesis – *The Design and Validation of a Computational Rigid Body Model of the Elbow*

Bachelor of Science, Department of Chemistry, Specialization in Biochemistry
University of Virginia – May 2004

Work Experience

Biocore, LLC - Biomechanics, Consulting, Research
Senior Researcher 2020-Present

Director for lower extremity injury prevention group. Team mission is to reduce the burden of lower extremity injuries in the NFL by leveraging best in class injury & exposure review, footwear evaluation, and surfaces research.

Key responsibilities include:

- Strategic development of injury intervention plans that improve the safety and performance of athlete equipment, facilities and stadia, rulemaking, and player coaching and training.
- Managing a multidisciplinary team of engineers, data scientists, biomechanists, and surface experts to inform the design and implementation of injury mitigating behaviors, equipment, and facilities.

University of Virginia, Center for Applied Biomechanics
Visiting Scholar 2020-Present
Research Scientist (Military Programs) 2016-2020
Research Associate 2014-2016

Worked as team lead for UVA in a technically diverse team of biomechanists, scientists, engineers, surgeons, and radiologists in the large multi-institution WIAMan Underbody Blast program contracted by the U.S. Army. This includes experimental planning, fixture design, data acquisition, analysis, and presentation of PMHS cadaveric experiments. Additionally, managed UVA contributions to the Scaling, Lower Extremity, Pelvis, and Whole-Body Working Groups. Technical responsibilities include:

- CAD (SolidWorks, CSWP®) design and adaptation of various high-energy test fixtures and cadaveric potting fixtures.

- Cadaveric preparation, custom instrumentation, Post-test dissection and injury classification
- Experimental data collection using multi-channel data acquisition systems (DTS SlicePro, -Micro, -TDAS, Hi-Techniques Synergy), high-speed video analysis systems (NAC GX1), CMM (Romer, FARO), and motion capture support (VICON);
- Data analysis using commercial (Mimics/3-Matic, Geomagics, SliceWare) and custom software solutions (Matlab, Python), including extensive GUI and toolbox development for leveraging of engineering principles to further biomechanic understanding.
- Aggregated and analyzed experimental and computational biomechanics data for presentations at technical and academic conferences, prepared manuscripts for publication in peer-reviewed literature, as well as mentoring to graduate students.

Virginia Commonwealth University, Orthopaedic Research Laboratory

Research Associate 2013-2014
Graduate Research Assistant 2008-2013

- Investigated *in vitro* and *in vivo* flatfoot kinematics using patient-matched rigid-body modeling- pre- and postoperatively. IRB approved study in collaboration with the Medical College of Virginia, Depts. of Orthopaedic Surgery, Radiology, and Physical Therapy.
- *In vitro* categorization of plantar force distributions following tendon transfer procedures in the treatment of Adult Acquired Flatfoot Deformity
- Design and validation of a computational algorithm to automatically detect and characterize in vivo acetabular and proximal femoral orientation
- Validation and prediction of cadaveric elbow kinematics using rigid-body modeling; application to complex varus instability.
- Extensive whole-body and lower extremity component dissection

Research Interests and Projects

- Sports Biomechanics
  - Foot and ankle injury tolerance during sporting activities
    - Midfoot (Lisfranc) injury experimentation and tolerance; adjuvants
    - Forefoot (“Turftoe”) injury experimentation and tolerance; adjuvants
    - Ankle (Syndesmosis) injury experimentation and tolerance
  - Cleat-surface traction mechanics and the role cleat aggressivity plays in on-field injury risk in elite American Football
  - Prediction of lower extremity injuries using on-field athlete tracking

- Military/Trauma Biomechanics
  - **W**arfighter **I**njury **A**ssessment **M**anikin (WIAMan) Project
    - Traumatic pelvis, foot & ankle, femur, and whole-body injuries secondary to vertical blast-loading
    - ATD design, validation, and testing
  - Behind Armor Blunt Trauma (BABT) for thoracic injury tolerance and protection
  - Material characterization for high rate loading regimes in pelvic & thoracic tissues

- Orthopaedic Biomechanics
  - Foot & Ankle injury physical and computational experimentation
    - Syndesmotic injury repair and device characterization
    - Total Ankle Replacement evaluation and effect of 2- vs 3- component TAR for development of subtalar 2°OA

- Development, Implementation and Demonstration of a Robotic Gait Simulator
  - UVA Strategic Innovation Grant
- Multi-Axial joint characterization using robotic test fixture
  - Varus/Valgus failure tolerance of intact knee
  - Passive joint mechanics (knee, ankle)
- Pelvis injury classification and prediction
  - Pelvic ring disruptions, Acetabular fractures, Gender-related injury prediction, THA, morphometrics

Associations & Professional Service

- Associate Editor, Foot and Ankle Orthopaedics 2018-2022
- Inaugural Member, ORS Foot & Ankle Research Interest Group 2017-2021
- Reviewer for:
  - Annals of Biomedical Engineering 2019-
  - Computer Methods in Biomechanics and Biomedical Engineering 2016-
  - Journal of Biomechanics 2015-
  - Journal of Orthopaedic Research 2014-
  - Orthopaedic Research Society (ORS) 2014-
  - Foot and Ankle International 2014-
  - Journal of Biomechanical Engineering 2013-
  - Summer Biomechanics, Bioengineering, & Biotransport Conf. (SB³C) 2015-
- Orthopaedic Research Society (ORS), Member 2012-
- American Society of Mechanical Engineers (ASME), Member 2010-
- Alpha Eta Mu Beta, Biomedical Engineering Honor Society, Member 2009-2012
- VAS, Biomedical & General Engineering Section Secretary 2011-2012
- Virginia Academy of Science (VAS), Member 2009-2012

Academic & Professional Honors

- ORS New Investigator Research Award (NIRA) Finalist 2019
- ASME, Bioengineering Division, Student Leadership Council 2013-2015
- PhD Podium Finalist, ASME Summer Bioengineering Conference 2013
- Special Recognition for Teaching Excellence, VCU School of Engineering 2012-2013
- Commonwealth Award for Engineering 2010
- Phi Kappa Phi National Fellowship Award 2009

Publications

A. Refereed Journal Publications

A1. Bustamante M; Watson B; Correia M; Rycman A; Yoder J; O'Cain C; Park G; Aldahir P; **Spratley, EM**; Cronin D. Synthetic Turf Finite Element Model Development and Validation. *Journal of Sports Engineering and Technology*. (2023) (In Review)

A2. Kuhn AW, Coughlin MJ, McGonegle SJ, Herzog MM, Weir N, **Spratley EM**, O'Cain CM, Anderson RB. Distal Tibiofibular Syndesmosis Injuries in the National Football League (NFL): A Spectrum of Pathology That Correlates with Time to Return to Play. *Sports Health*. (2023) (In Review)

A3. Uflacker AB, Keefe N, Bruner ET, Avery A, Salzar R, Henderson K, **Spratley EM**, Nacey N, Miller W, Grewal S. Assessing Effects of Geniculate Artery Embolization in a Non-Surgical Animal Model of Osteoarthritis. *Journal of Vascular and Interventional Radiology*. 33 (9), 1073-1082. e2 (2022) [https://doi.org/10.1016/j.jvir.2022.05.015]

A4. Salzar RS, **Spratley EM**, Henderson KH, Greenhalgh PC, Zhang JY, Perry BJ, McMahon JA. The Mechanical Response and Tolerance of the Anteriorly Tilted Human Pelvis Under Vertical Loading. *Annals of Biomedical Engineering*. 49, 2975-2989, 2021. [doi: 10.1007/s10439-020-02634-6]

A5. Kent RW, Yoder J, O'Cain CM, **Spratley EM**, Arbogast KB, Sorochan JC, McNitt AS, Serensits TJ. Force-limiting and the mechanical response of natural turfgrass used in the National Football League; A step toward the elimination of differential lower limb injury risk on synthetic turf. *Journal of Biomechanics*. 127:110670, 2021. [https://doi.org/10.1016/j.jbiomech.2021.110670]

A6. Bosch KB, Good AB, **Spratley EM**, Salzar RS, Begeman PC, Cavanaugh JM. Optimization of Underbody Blast Energy-Attenuating Seat Mechanisms Using Modified MADYMO Human Body Models. *Journal of Biomechanical Engineering*. 2021. 143(6): 061006. [https://doi.org/10.1115/1.4050025]

A7. Tse KM, Robinson D, Franklyn M, Zhang JY, **Spratley EM**, Salzar RS, Fernandez J, Ackland DC, Lee PVS. Sensitivity of pelvic orientation on underbelly blast-induced pelvic fracture: A finite element study. *Journal of the Mechanical Behavior of Biomedical Materials*. 2020. 108, p. 103780. [doi: 10.1016/j.jmbbm.2020.103780]

A8. Durgin CF III, **Spratley EM**, Satpathy J, Jiranek WA, Wayne JS. Automated 3-D Segmentation of the Proximal Femur with Proximal Femoral Markers of Native Femoral Anteversion. *Journal of Orthopaedic Research* 35:1724–1731, 2017. [doi: 10.1002/jor.23455]

A9. Pietsch HA, Bosch KB, Smith TA, Sagara BM, **Spratley EM**, Henderson KA, Salzar RS, Demetropoulus CK, Dooley CJ. Evaluation of PMHS Response and WIAMan Technology Demonstrator Biofidelity in Simulated Under-Body Blast Events. *Stapp Car Crash Journal*. 2016. Vol. 60. Pp.199-246 [PMID: 27871099]

A10. **Spratley EM**, Matheis EA, Hayes CW, Adelaar RS, Wayne JS. Effects of Degree of Surgical Correction for Flatfoot Deformity in Patient-Specific Computational Models. *Annals of Biomedical Engineering.* 2014. 43(8) p.1947-1956 [doi: 10.1007/s10439-014-1195-1]

A11. Higgins SW, **Spratley EM**, Boe RA, Hayes CW, Jiranek WA, Wayne JS. A Novel Approach for Determining 3-D Acetabular Orientation: Results from 200 Normal Patients. *Journal of Bone & Joint Surgery*, 2014. 96(21) p.1776-1784 [doi: 10.2106/JBJS.L.01141]

A12. Matheis EA, **Spratley EM**, Hayes CW, Adelaar RS, Wayne JS. Plantar Measurements to Determine Success of Surgical Correction of Stage IIb Adult Acquired Flatfoot Deformity. *Journal of Foot & Ankle Surgery*. 2014. 53(5) p.562-566 [doi: 10.1053/j.jfas.2014.03.020]

A13. **Spratley EM**, Matheis EA, Hayes CW, Adelaar RS, Wayne JS. A Population of Patient-Specific Adult Acquired Flatfoot Deformity Models Before and After Surgery. *Annals of Biomedical Engineering.* 2014. 42(9) p1913-1922
[doi: 10.1007/s10439-014-1048-y]

A14. **Spratley EM**, Matheis EA, Hayes CW, Adelaar RS, Wayne JS. Validation of a Population of Patient-Specific Adult Acquired Flatfoot Deformity Models. *Journal of Orthopaedic Research.* 2013. 31(12) p.1861
[doi:10.1002/jor.22471]

A15. **Spratley EM**, Arnold JM, Owen JR, Glezos CD, Adelaar RS, Wayne JS. Plantar Forces in Flexor Hallucis Longus vs. Flexor Digitorum Longus Transfer in Adult Acquired Flatfoot Deformity. *Foot and Ankle International*. 2013. 34(9) p.1286
[doi: 10.1177/1071100713487724]

A16. **Spratley EM**, Wayne JS. Computational Model of the Human Elbow and Forearm: Application to Complex Varus Instability. *Annals of Biomedical Engineering*. 2011. 39(3) p.1084
[doi: 10.1007/s10439-010-0224-y]
- Chosen for Issue Cover

B. Conference Publications & Invited Talks

B1. Spratley EM, The Role of Footwear In Injury Prevention – The NFL Experience. American Orthopaedic Foot & Ankle Society. AOFAS2023. (2023) (Invited Lecture)

B2. Bruner ET, Avery A, Grewal SK, Haskal, Salzar RS, Henderson KA, **Spratley EM**, Miller GW, Nacey NC, Uflacker A. Assessing Effects of Geniculate Artery Embolization in a Non-Surgical Animal Model of Osteoarthritis; Society of Interventional Radiology. (2022). SIR2022-1131141. (Podium Presentation)

B3. Coughlin MJ, Anderson RB, **Spratley EM**, McGonegle SJ, O'Cain CM, Kent RW. Research on the High Ankle Sprain (HAS): Misconceptions (I see) based on my NFL experience. American Orthopaedic Foot & Ankle Society. AOFAS2021. (2021) (Podium Presentation)

B4. Dibbern KN, Smith HJ, Anderson DD, McMurry TL, **Spratley EM**. Advanced Risk Analyses of Post-traumatic Osteoarthritis Development Based on Objective Measures of Injury Severity Indicate Differences in Injury Tolerance Across Joints; Orthopaedic Research Society. (2021). ORS2021-LB-1633-ORS. (Oral poster)

B5. Uflacker A, Keefe N, Salzar RS, Henderson KA, **Spratley EM**, Nacey N, David B, Whitehair R, Chahin J, Safavian D, Neiderer J, Stone J, Wick M, Cui Q, Haskal Z. Intraarticular sodium monoiodoacetate injection induced osteoarthritis in sheep: a non-surgical large animal model for geniculate artery embolization. Society of Interventional Radiology Annual Meeting (2019). *Journal of Vascular and Interventional Radiology* 30, S264. (Abstract 613)
https://doi.org/10.1016/j.jvir.2018.12.718

B6. Spivey AW, O'Cain CM, Gepner BD, **Spratley EM**, Roberts CW, Kerrigan JR. Development of a Muscle Actuated Robotic System (MARS) for the Investigation of Lower Extremity Bony Kinematics. International Research Council on Biomechanics of Injury (IRCOBI) (2019) (Podium Presentation)

B7. **Spratley EM**, Greenhalgh PG, Henderson KA, Zhang JY, Salzar RS. Local Injury Tolerance of the Human Pelvis in High-Rate Vertical Loading. Centre for Blast Injury Studies (CBIS) Blast Injury Conference (2019). (Podium Presentation)

B8. Spivey AW, O'Cain CM, Gepner BD, **Spratley EM**, Kerrigan JR. Development of a Muscle Actuated Robotic System (MARS) for the Investigation of Lower Extremity Function. Injury Biomechanics Symposium (OSU-IBRC) (2019) (Podium Presentation)

B9. Spivey AW, O'Cain CM, Gepner BD, **Spratley EM**, Kerrigan JR. Implementing Real-Time Extrinsic Muscle Control in a Robotic Gait Simulator for Investigating Lower Extremity Function. Summer Biomechanics, Bioengineering, and Biotransport (SB3C) Conference. (2019).

B10. O'Cain CM, Gepner BD, Donlon JP, **Spratley EM,** Kerrigan JR, Kent RW. Implementation of Biofidelic Bone-Ligament Interaction in a Lower Extremity Finite Element Model. 15th U.S. National Congress on Computational Mechanics. (2019) (Podium Presentation)

B11. O'Cain CM, Gepner BD, Kerrigan JR, Kent RW, **Spratley EM.** Effects of Syndesmotic Injury and Fixation on Tibiotalar Response; Orthopaedic Research Society. (2019). ORS2019-A-606-ORS. (Podium Presentation; NIRA Finalist)

B12. O'Cain CM, Kerrigan JR, **Spratley EM**, Kent RW. In Situ Ligament Strain Estimation from 3D Motion Capture of Multiaxial Bony Kinematics; Orthopaedic Research Society. (2019). ORS2019-LB-4257-ORS.

B13. **Spratley EM,** O'Cain CM, Donlon JP, Gepner BD, Ligament Wrapping in a Finite Element Model for Predicting Sprains within the Mid- and Forefoot. International Research Council on Biomechanics of Injury (IRCOBI) (2018) (Podium Presentation)

B14. Greenhalgh PG, Panzer MD, **Spratley EM**, Salzar RS. Analysis of Forces through the Seated Pelvis during Under Body Blasts; 13th World Congress on Computational Mechanics (2018). WCCM2018-1017.

B15. **Spratley EM**, Characterization, Prediction, and Prevention of Musculoskeletal Injuries in Vehicular Blast Loading. Virginia Commonwealth University, Department of Biomedical Engineering Seminar (2018). (Invited Lecture)

B16. **Spratley EM**, Henderson KA, Voo L, Bilodeau SM, Salzar RS. Injury Tolerance for Blast Mediated Bending of the Human Femur. 8th World Congress of Biomechanics. (2018). WCB2018-O0234. (Podium Presentation)

B17. Greenhalgh PC, **Spratley EM**, Zhang JY, Bilodeau SM, Salzar RS. Injury Distribution and Risk of Up-Right Seating Postures in Under-Body Blast Scenarios. 8th World Congress of Biomechanics. (2018). WCB2018-O0340. (Podium Presentation)

B18. Henderson KA, **Spratley EM**, Demetropoulus C, Alai A, Hughes FJ, Salzar RS. Occupant Response to Underbody Blast. 8th World Congress of Biomechanics. (2018). WCB2018-O0460. (Podium Presentation)

B19. Dibbern KN, Perry BJ, **Spratley EM**, Salzar RS, Rivera J, Anderson DD. Novel Severity Measures Link Articular Fractures from Cadaveric Experiments to Those in Actual Military Cases. 8th World Congress of Biomechanics. (2018). WCB2018-O0464. (Podium Presentation)

B20. Baker A, Hendricks J, Weaver A, **Spratley EM**, Salzar RS. Scaling Effects on Injury Risk Curves for Femoral Mid-Shaft Bending Fracture. 8th World Congress of Biomechanics. (2018). WCB2018-O0341. (Podium Presentation)

B21. Baker AM, Hsu FC, Salzar RS, **Spratley EM**, Voo L, Gayzik FS. Evaluation of Four Strategies to Decrease Normalized Confidence Interval Size of Injury Risk Curves. 8th World Congress of Biomechanics. (2018). WCB2018-O0345. (Podium Presentation)

B22. Donlon JP, Gepner BD, Fox MC, **Spratley EM**, Forman JL, Kent RW. A Computationally Efficient Method to Model Soft-Tissue Wrapping in Finite Element Arthrodial Joint Models: Application to

the Foot and Ankle. 8th World Congress of Biomechanics. (2018). WCB2018-P4309.

B23. Ortiz-Paparoni, Cutliffe, Yoganandan, **Spratley EM**, Salzar RS, Voo L, Bass DC. Quantitative Computed Tomography (QCT) Male Population Norms for Injury Biomechanical Scaling in a Military Population. 8th World Congress of Biomechanics. (2018). WCB2018-P0234.

B24. Sun Z, Gepner B, **Spratley EM**, Toczyski J, Kerrigan JR. Response of the knee joint to translational and bending loads. Association for the Advancement of Automotive Medicine (AAAM) (2017) (Podium Presentation)

B25. Sun Z, Gepner B, **Spratley EM**, Toczyski J, Kerrigan JR. New Approaches to Pedestrian Knee Joint Biomechanics. International Research Council on Biomechanics of Injury (IRCOBI) (2017) (Podium Presentation)

B26. **Spratley EM**, Rawska K, Demetropoulus CK, Merkle AC, Salzar RS. Local vs. Global Motion in Whole-Body UBB Testing. NATO HFM-271. Injury assessment methods for vehicle occupants in blast-related events. (2016)

B27. Perry BJ, Greenhalgh PC, Henderson, KA, **Spratley EM**, Zhang JY, Merkle AC, Salzar RS. Effects of Seated Soldier Posture on Pelvic Force Transmissibility. NATO HFM-271. Injury assessment methods for vehicle occupants in blast-related events. (2016)

B28. Perry BJ, Henderson KA, **Spratley EM**, Zhang JY, Merkle AC, Salzar RS. Effects of Seated Soldier Posture on Pelvic Force Transmissibility. Summer Biomechanics, Bioengineering, and Biotransport (SB3C) Conference. (2016). SB³C2016-1006 (Podium Presentation)

B29. Chen JG, Park G, **Spratley EM**, Salzar RS. Dynamic Bending Response of the Unrestrained Femur in Underbody Blast Loading. Summer Biomechanics, Bioengineering, and Biotransport (SB3C) Conference. (2016). SB³C2016-1102

B30. Durgin CF III, **Spratley EM**, Mutter O, Satpathy J, Jiranek WA, Wayne JS. Automated 3-D Segmentation of the Proximal Femur with Implications for an Intraoperative Marker of Native Femoral Anteversion. Orthopaedic Research Society. (2016) PS1-075

B31. **Spratley EM**, Rawska K, Kim T, Salzar RS. Fidelity of the MADYMO Facet Pedestrian Model for Simulation of Underbody Blast Events. 53rd Annual SAFE Symposium. (2015). (Podium Presentation)

B32. **Spratley EM**, Matheis EA, Adelaar RS, Hayes CW, Wayne JS. Parametric Modeling of Hypothetical Surgical Correction in a Cohort of Patient-Specific Flatfoot Models. 7th World Congress of Biomechanics. (2014). 14-IS-4912-WCB (Podium Presentation)

B33. **Spratley EM**, Matheis EA, Adelaar RS, Hayes CW, Wayne JS. Post-Operative Changes to a Cohort of Patient-Matched Models of Adult Acquired Flatfoot Deformity. Orthopaedic Research Society. (2014). ORS2014-0141. (Podium presentation)

B34. **Spratley EM**, Matheis EA, Adelaar RS, Hayes CW, Wayne JS. Patient Specific Modeling of a Stage II Flatfoot Population. ASME Summer Bioengineering Conference. (2013). SBC2013-14165. (Podium presentation)

B35. Higgins SW, **Spratley EM**, Jiranek WA, Wayne JS. Automated Computational Acquisition of 3-D Patient-Specific Acetabular Orientation. ASME / FDA Frontiers in Medical Devices. (2013). FMD2013-16110. (Podium presentation)

B36. **Spratley EM**, Matheis EA, Adelaar RS, Hayes CW, Wayne JS. Plantar Loading in a Patient-Matched Computational Model of Adult Flatfoot before and after Surgery. Orthopaedic Research Society. (2013). ORS2013-0358. (Podium presentation)

B37. Matheis EA, **Spratley EM**, Adelaar RS, Wayne JS. Pre-Operative & Post-Operative Plantar Pressures in Stage IIb Posterior Tibial Tendon Insufficiency. Orthopaedic Research Society. (2013). ORS2013-1929

B38. **Spratley EM**, Matheis EA, Hayes CW, Adelaar RS, Wayne JS. Patient Specific Modeling of Stage II Flatfoot Deformity Before & After Surgery; American Orthopaedic Foot & Ankle Society. (2012). AOFAS2012-501.

B39. Arnold JM, **Spratley EM**, Owen JR, Glezos CD, Adelaar RS, Wayne JS. Plantar Forces in FHL vs. FDL Transfer in Adult Acquired Flatfoot Deformity; American Orthopaedic Foot & Ankle Society. (2012). AOFAS2012-536. (Podium presentation)

B40. **Spratley EM**, Matheis EA, Hayes CW, Adelaar RS, Wayne JS. Patient Specific Modeling of Stage II Flatfoot Deformity Before and After Surgical Correction; ASME Summer Bioengineering Conference. (2012). SBC2012-80366.

B41. **Spratley EM**, Matheis EA, Adelaar RS, Hayes CW, Wayne JS Patient Specific Computational Modeling of Adult Acquired Flatfoot Deformity; Orthopaedic Research Society. (2012). ORS2012-1898.

B42. Arnold JM, **Spratley EM**, Owen JR, Glezos CD, Adelaar RS, Wayne JS. Plantar Forces in Flexor Hallucis Longus vs. Flexor Digitorum Longus Transfer in Adult Acquired Flatfoot Deformity; Orthopaedic Research Society. (2012). ORS2012-1897.

B43. **Spratley EM**, Wayne JS, A Computational Study of Complex Varus Instability of the Human Elbow Joint; ASME Summer Bioengineering Conference. (2010). SBC2010-19599. (Podium presentation)

C. Patent Filings

C1. 1. Crandall, J., **Spratley EM**, P. Aldahir, Z. Sutton, and S. Sutton. Automated turf testing apparatus and system for using same. Patent: US20230096232A1, 2023.

C2. Crandall, J., R. Kent, **Spratley EM**, J. Yoder, T. Cisneros, P. Aldahir, and J. Lipari. Automated turf testing apparatus and system for using same. Patent: US20220039747A1, 2022.

Research Contracts

Years	Title	Sponsor
2019-2020	Response to Human Ankle Following Total Ankle Replacement	Paragon28 (PI)
2019-2020	Modeling the Biomechanics of the Human Ankle Syndesmosis – Phase II	Paragon28 (PI)
2018	Modeling the Biomechanics of the Human Ankle Syndesmosis	Paragon28 (PI)
2018-2019	Effects of Total Ankle Replacement on Subtalar Fusion	Stryker Orthopaedics (Co-PI)
2018-2020	Incapacitation Prediction for Readiness in Expeditionary Domains: an Integrated Computational Tool (I-PREDICT)	Southwest Research Institute (SWRI) (Co-PI)
2018-2019	Warfighter Injury Assessment Manikin (WIAMan); Phase 2	United States Army Aeromedical Research Laboratory (Co-PI)
2016-2017	Assessing the Accuracy of Video-Reconstructed Helmet Kinematics	Biocore, LC (Co-PI)

Special Skills

- SOFTWARE:
  - Matlab
    - Signal Analysis
    - GUI design
    - Image Processing
  - MIMICS & 3-Matic
  - SolidWorks (CSWP® Certified)
  - DTS Sliceware & DataPro
  - R Statistical Software / Minitab
  - GeoMagics & DesignX
- DISSECTION & HUMAN ANATOMY
- TESTING:
  - Vicon Motion Capture w/ Nexus®
  - XSENS IMU Motion Capture
  - Novel loadSol in-shoe force measurement
  - Tekscan HRMat® plantar force system
  - KUKA 6DOF Robot (KR300 R2500 Ultra)
  - DTS Slice® & TDAS PRO
  - Romer® CMM
  - DSD Adv. Side Impact System®
  - MTS Intron w/ TestWorks®
  - ARAMIS non-contact strain measurement