CODY M. O'CAIN

Senior Engineer, Biocore LLC
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EDUCATION

M.S., Mechanical & Aerospace Engineering December 2019
University of Virginia, Charlottesville, VA
Thesis: "Lisfranc Injury: A Mechanism, Tolerance, and Model Development"

B.S., Biomedical Engineering May 2017
Tulane University, New Orleans, LA
Thesis: "Biomechanical Roles of Glycosaminoglycan Clusters in Tendon Homeostasis"

EXPERIENCE

Senior Engineer March 2020 – Present
Biocore LLC, Charlottesville, VA
- Engineer for lower extremity injury mitigation, surface, and cleat research
- Focused on identifying intervention pathways for lower extremity injuries of NFL athletes to guide countermeasures, equipment design, training, and facilitate research to improve player health and safety

Graduate Research Assistant August 2017 – December 2019
University of Virginia, Charlottesville, VA
- Managed and executed several independent research projects
- Identified injury mechanism and tolerance for midfoot injury through cadaveric testing and finite element modeling
- Developed methodology to automate the creation of specimen-specific lower extremity finite element models to investigate the effects of structural variation of the midfoot
- Evaluated the effect of variation in ligament stiffness on midfoot injury tolerance
- Evaluated sensitivity of different methods for syndesmotic fixation on ankle response with the use of a lower extremity finite element model
- Aided with the mechanical characterization of cadaveric ankles with and without total ankle replacements on a gait simulator

Research Assistant January 2015 – June 2017
Tulane University, New Orleans, LA
- Developed finite element modeled of glycosaminoglycan increase at the local tissue level during tendon overuse

Biomedical Division Intern May – August 2016
Veteran Affairs Hospital, New Orleans, LA
- Managed government budget to instrument the new dental wing of hospital
- Discussed with vendors and veterans to procure equipment that best fit needs

Workshop Technician October 2015 – June 2017
Scot Ackerman MakerSpace, New Orleans, LA
- Supervised and taught students about additive and subtractive manufacturing techniques

TECHNICAL SKILLS

- FEA (LS-DYNA, Altair HyperWorks)
- CAD (SOLIDWORKS, Autodesk Inventor)
- Programming (MathWorks MATLAB, Python, SQL)
- Motion Capture (Vicon Nexus)
- Data Collection (DTS SLICEWare)
- Segmentation (Materialise Mimics, Materialise 3-Matic)
- Additive and Subtractive Manufacturing (3D Printing, CNC Machining)

AWARDS & HONORS

- Co-host of American Society of Biomechanics – New to Industry Roundtable, 2021
- USNCCM15 Travel Award, 2019
- IRCOBI Europe Travel Award, 2018
- James A. Cronvich Award, 2017
- Kenneth H. Kuhn Sr. Memorial Award, 2017
- Oscar Lee Putnam Cultural and Enrichment Grant, 2016
- Tulane Leadership Scholarship, 2013 - 2016
- Texas Ladies Auxiliary Scholarship, 2013 - 2016

PUBLICATIONS & CONFERENCE PRESENTATIONS

- R. Kent, J. Yoder, C. M. O'Cain, E. M. Spratley, K. B. Arbogast, J. Sorochan, ... & T. Serensits, (2021). 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.
- C. M. O'Cain, B. D. Gepner, J. S. Park, R. W. Kent, J. R. Kerrigan, E. M. Spratley "Fibulotalar Cartilage Sensitivity to Syndesmotic Screw Vs. Suture Fixation," Orthopaedic Research Society, February 8-11, 2019, Phoenix, AZ, USA.
- C. M. O'Cain, B. D. Gepner, J. P. Donlon, E. M. Spratley, J. R. Kerrigan, R. W. Kent, "Implementation of Biofidelic Bone-Ligament Interaction in a Lower Extremity Finite Element Model," U.S. National Congress on Computational Mechanics, July 28 – August 1, 2019, Austin, TX, USA.
- C. M. O'Cain, B. D. Gepner, E. M. Spratley, J. R. Kerrigan, R. W. Kent, "Pipeline for Specimen Specific Bone-Ligament-Cartilage Finite Element Models," Ohio State Injury Biomechanics Symposium," May 19-21, 2019, Columbus, OH, USA.
- C. M. O'Cain, B. D. Gepner, J. R. Kerrigan, R. W. Kent, E. M. Spratley, "Effects of Syndesmotic Injury and Fixation on Tibiotalar Response," Orthopaedic Research Society, February 2-5, 2019, Austin, TX, USA.
- C. M. O'Cain, J. R. Kerrigan, E. M. Spratley, R. W. Kent, "In Situ Ligament Strain Estimation from 3D Motion Capture of Multiaxial Bony Kinematics," Orthopaedic Research Society, February 2-5, 2019, Austin, TX, USA.
- C. M. O'Cain, S. Roccabianca, R.C. Anderson, K.S. Miller, "Biomechanical Roles of Glycosaminoglycan Clusters in Tendon Homeostasis," Summer Biomechanics, Bioengineering, and Biotransport Conference, June 21-24, 2017, Tucson, AZ, USA.
- W. Spivey, C. M. O'Cain, B. D. Gepner, E. M. Spratley, J. S. Park, J. R. Kerrigan, "Effect of Total Ankle Replacement On Ankle Kinematics During Internal Rotation," Orthopaedic Research Society, February 8-11, 2019, Phoenix, AZ, USA.
- E. M. Spratley, C. M. O'Cain, J. P. Donlon, B. D. Gepner, J. L. Forman, R. W. Kent, "Ligament Wrapping in a Finite Element Model for Predicting Strain within the Midfoot and Forefoot," International Research Council of Biomechanics of Injury, September, 12-14, 2018, Athens, Greece.
- W. Spivey, C. M. O'Cain, B. D. Gepner, E. M. Spratley, J. R. Kerrigan, "Development of Dynamic Muscle Activation System for the Investigation of Lower Extremity Function," Ohio State Injury Biomechanics Symposium," May 19-21, 2019, Columbus, OH, USA.
- W. Spivey, C. M. O'Cain, B. D. Gepner, E. M. Spratley, J. R. Kerrigan, "Implementing Real-Time Extrinsic Muscle Control in a Robotic Gait Simulator for Investigating Lower Extremity Function," Summer Biomechanics, Bioengineering, and Biotransport Conference, June 25-28, 2019, Seven Springs, PA, USA.