

MICHAEL A. SAMAAAN

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Education

Assistant Professor University of Kentucky Department of Kinesiology & Health Promotion	2018 – Present
Postdoctoral Fellow University of California – San Francisco Musculoskeletal and Quantitative Imaging Research Group Department of Radiology and Biomedical Imaging	2014 – 2018
Ph.D. Mechanical and Aerospace Engineering Old Dominion University	2010 – 2014
M.S. Biomedical Engineering University of Texas at San Antonio	2008 – 2009
B.S. Biomedical Engineering Minor: Mathematics Rutgers University	2004 – 2008

Research Interests: biomechanics, musculoskeletal modeling, musculoskeletal imaging, lower extremity joint function/health, osteoarthritis, femoroacetabular impingement, neuromuscular fatigue, numerical optimization

Research Funding

UCSF Dept. of Radiology Seed Grant Role: PI <i>“Assessment of Bone Remodeling and Cartilage Composition in Femoroacetabular Impingement Patients after Hip Femoroplasty using PET and QMRI”</i>	2017 – Present
NIH-NIAMS F32 (AR069458) Role: PI Mentor: Sharmila Majumdar, Co-Mentor: Richard Souza <i>“Longitudinal Assessment of the Effects of Hip Arthroscopy on Articular Cartilage Biochemistry through a Novel Quantitative MRI-Based Approach”</i>	2016 – 2018
UCSF Dept. of Radiology Seed Grant Role: PI <i>“Longitudinal Effects of Hip Arthroscopy on Cartilage and Muscle Composition”</i>	2015 – 2017

Peer Reviewed Journal Articles

1. Shimizu, T., **Samaan, M.A.**, Tanaka, M.S., *et al* “Abnormal biomechanics at six months are associated with cartilage degeneration at three years following anterior cruciate ligament reconstruction” Arthroscopy **In Press**
2. Grace, T., Neumann, J., **Samaan, M.A.**, *et al*. “Using the Scoring Hip Osteoarthritis with Magnetic Resonance Imaging (SHOMRI) System for Assessment of Intra-articular Pathology in Femoroacetabular Impingement.” Journal of Orthopaedic Research **In Press**
3. Neumann, J., Zhang, A.L., Schwaiger, B.J., **Samaan, M.A.**, *et al*. “Validation of Scoring Hip Osteoarthritis with MRI (SHOMRI) Scores using Hip Arthroscopy as a Standard Reference” European Radiology **In Press**
4. Grace, T., **Samaan, M.A.**, Souza, R.B., *et al* “Correlation of Patient Symptoms with Labral and Articular Cartilage Damage in Femoroacetabular Impingement” Orthopaedic Journal of Sports Medicine **In Press**
5. **Samaan, M.A.**, Ringleb, S.I., Bawab, S.Y., *et al* (2018) “Neuromuscular Compensations During the Star Excursion Balance Test and Single Leg Hop after ACL-Reconstruction in a Collegiate Athlete” Computer Methods in Biomechanics and Biomedical Engineering **21**(4): 344-358
6. Rossi-deVries, J., Pedroia, V., **Samaan, M.A.**, *et al*, “Using Multidimensional Topological Data Analysis to Identify Traits of Hip OA” Journal of Magnetic Resonance Imaging **In Press**
7. Adusumilli, G., Joseph, S., **Samaan, M.A.**, *et al* (2018) “Applicability and Validity of an iOS-Based Accelerometer App in Tracking Outcome Variables of the 30-second Chair Stand Test and Stair Climb Test” Journal of Medical Internet Research mHealth & uHealth **5**(10): e166.
8. **Samaan, M.A.**, Pedroia, V., Zhang, A.L., *et al*. (2018) “A Novel MR-based Method for Detection of Cartilage Delamination in Femoroacetabular Impingement Patients” Journal of Orthopaedic Research **36**(3): 971-978.
9. Pedroia, V., **Samaan, M.A.**, Inamdar, G.P., *et al* (2018) “Study of the Interactions Between Proximal Femur 3D Bone Shape, Cartilage Health and Biomechanics in Patients with Hip Osteoarthritis” Journal of Orthopaedic Research **36**(1): 330-341.
10. **Samaan, M.A.**, Facchetti, L., Pedroia, V., *et al* (2017) “Cyclops Lesions are Associated with Altered Gait Patterns and Medial Knee Joint Cartilage Degeneration at One Year after ACL-Reconstruction” Journal of Orthopaedic Research **35**(10): 2275-2281.
11. **Samaan, M.A.**, Schwaiger, B.J., Gallo, M.C., *et al* (2017) “Abnormal Joint Moment Distributions and Functional Performance During Sit-to-Stand in Femoroacetabular Impingement Patients” Physical Medicine & Rehabilitation **9**(6): 563-570.

12. **Samaan, M.A.**, Schwaiger, B.J., Gallo, M.C., *et al* (2017) “Sagittal Plane Joint Loading During Gait is Associated with Hip Joint Abnormalities in Femoroacetabular Impingement Patients” American Journal of Sports Medicine **45**(4): 810-818.
13. **Samaan, M.A.**, Zhang, A.L., Gallo, M.C., *et al* (2016) “Quantitative Magnetic Resonance Arthrography in Patients with Femoroacetabular Impingement” Journal of Magnetic Resonance Imaging **44**(6):1539-1545.
14. **Samaan, M.A.**, Weinhandl, J.T., Bawab, S.Y., *et al* (2016) “Determining Residual Reduction Algorithm Kinematic Tracking Weights For a Sidestep Cut via Numerical Optimization.” Computer Methods in Biomechanics and Biomedical Engineering **19**(16): 1721-1729.
15. **Samaan, M.A.**, Ringleb, S.I., Bawab, S.Y., *et al* (2016) “Anterior Cruciate Ligament (ACL) Loading in a Collegiate Athlete During Sidestep Cutting After ACL Reconstruction: A Case Study” The Knee **23**(4): 744-752.
16. Schwaiger, B.J., Gersing, A.S., Lee S., Nardo, L., **Samaan, M.A.**, *et al* (2016) “Longitudinal Assessment of MRI in Hip Osteoarthritis Using SHOMRI and Correlation with Clinical Progression.” Seminars in Arthritis and Rheumatism **45**(6): 648-655.
17. **Samaan, M.A.**, Weinhandl, J.T., Hans, S.A., *et al* (2016) “Predictive Neuromuscular Fatigue of the Lower Extremity Utilizing Computer Modeling.” Journal of Biomechanical Engineering. **138**(1): 011008.
18. **Samaan, M.A.**, Teng, H-L, Kumar, D., *et al* (2015) “Acetabular Cartilage Defects Cause Altered Hip and Knee Joint Coordination Variability During Gait.” Clinical Biomechanics. **30**(10): 1202 – 1209.
19. **Samaan, M.A.**, Greska, E.K., Hoch M.C. *et al.* (2015) “Dynamic Postural Control Two Years Following Anterior Cruciate Ligament Reconstruction in a Female Collegiate Soccer Player”. International Journal of Athletic Therapy and Training **20**(2): 24 – 29.
20. **Samaan, M.A.**, Hoch, M.C., Ringleb, S.I., *et al.* (2015) “Isolated Hamstrings Fatigue Alters Joint Coordination During a Cutting Maneuver”. Journal of Applied Biomechanics **31**(2): 102 – 110.
21. Choisne, J., Ringleb, S.I., **Samaan, M.A.**, *et al.* (2012) “Influence of Kinematic Analysis Methods on Detecting Ankle and Subtalar Joint Instability.” Journal of Biomechanics **45**(1): 46 – 52.

Articles in Review

1. **Samaan, M.A.**, Grace, T, Zhang, A.L., *et al* “Short Term Outcomes of Hip Arthroscopy on Gait Mechanics in Patients with Femoroacetabular Impingement Syndrome” JOSPT
2. **Samaan, M.A.**, Zhang, A.L., Popovic, T., *et al* “Hip Joint Muscle Forces during Gait in Patients with Femoroacetabular Impingement Syndrome are Associated with Patient Reported Outcomes and Cartilage Composition” Journal of Biomechanics

3. Inamdar, G., Pedroia, V., Rossi-Devries, J., **Samaan, M.A.**, *et al* “Longitudinal Variations in Proximal Femur MRI-based 3D Morphology are Associated with Cartilage Health and Symptoms in Patients with Hip Osteoarthritis” Journal of Orthopaedic Research
4. Mah, C., Sparks, A., **Samaan, M.A.**, *et al* “Sleep Restriction Impairs Maximal Jump Performance and Alters Lower Extremity Joint Coordination Variability in Elite Athletes” Journal of Sports Sciences
5. Osmanzada, H., **Samaan, M.A.**, Raymer, A.M., *et al* “Kinematic Analysis of Gesture in Aphasia” Journal of Applied Biomechanics
6. Shimizu, T., Zhang, Z., Li, Q., Samaan, M.A., *et al* “Sagittal Biomechanical Asymmetries during Landing are Associated with Increases in Joint Laxity after Anterior Cruciate Ligament Reconstruction” Knee Surgery, Sports Traumatology, Arthroscopy

Research Products

Residual Reduction Algorithm MATLAB Graphical User Interface (SimTK)	2017
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Invited Lectures/Presentations

UCSF Radiology Retreat	2018
Bay Area Biomedical Device Conference (San Jose State University)	2018
Use of MSK Imaging in Biomechanical Analyses (UCSF, MSBI240)	2017
Introduction to Radiography (UCSF, PT210)	2017
Introduction to Gait Biomechanics (UCSF, PT706)	2016
Radiological Imaging and Biomechanics (UCSF, PT210)	2016
Introduction to Radiography (UCSF, PT210)	2015
Clinical Applications of Musculoskeletal Modeling (UCSF, PT419)	2015
Kinesiology and Biomechanics (Santa Clara University, BIO103)	2015

Teaching Experience

Teaching Assistant, Radiology for Physical Therapists (PT 210)	2015 – 2018
Instructor, Exploring Engineering Technology (ENGN 110)	2013 – 2014
Graduate Teaching Assistant, Project Management II (MAE 435)	2012 – 2014
Instructor, Solid Mechanics Laboratory (MAE 225)	2010 – 2014
Graduate Teaching Assistant, Solid Mechanics (MAE 220)	2010 – 2011

Honors and Awards

Orthopaedic Research Society Travel Grant, Force & Motion Foundation	2017
Outstanding Graduate Student Award, Old Dominion University	2014
OpenSim Workshop Travel Award	2013
Tiwari Endowed Graduate Scholarship, Old Dominion University	2013
Graduate Student Travel Award, Old Dominion University	2010
James Dickson Carr Scholarship, Rutgers University	2004

Certifications

Scientific Leadership and Management	2016
Preparing Future Faculty	2013

Professional Service

IEEE Transactions on Human-Machine Systems (Reviewer)	2018 – Present
Journal of Orthopaedic Research (Reviewer)	2018 – Present
American Society of Biomechanics Awards Committee	2017
American Society of Biomechanics Abstract Reviewer	2017
Journal of Biomechanics (Reviewer)	2017 – Present
Journal of Applied Biomechanics (Reviewer)	2017 – Present
Gait & Posture (Reviewer)	2017 – Present
Journal of Orthopaedic & Sports Physical Therapy (Reviewer)	2017 – Present
PeerJ (Reviewer)	2017 – Present
Journal of Sport and Health Science (Reviewer)	2016 – Present
Journal of Magnetic Resonance Imaging (Reviewer)	2016 – Present
Bone (Reviewer)	2016 – Present
Annals of Sports Medicine and Research (Reviewer)	2016 – Present
Scandinavian Journal of Science and Medicine in Sports (Reviewer)	2016 – Present
Computer Methods in Biomechanics and Biomedical Engineering (Reviewer)	2015 – Present

Community Service

Volunteer at Bay Area Science Festival	2014 – 2016
Volunteer at UCSF Physical Therapy Applicant Tours/Interviews	2014 – 2018

Professional Memberships

American College of Sports Medicine	2018 – Present
UCSF Core Center for Musculoskeletal Biology and Medicine	2016 – 2018
Osteoarthritis Research Society International	2016 – Present
Orthopaedic Research Society	2015 – Present
American Society of Mechanical Engineers	2011 – Present
American Society of Biomechanics	2010 – Present
Biomedical Engineering Society	2008 – Present

Peer Reviewed Conference Abstracts

1. Noginova, J.M, Bennett, H.J., **Samaan, M.A.**, Ringleb, S.I. “The Effects of Subtalar Axis Orientation on Kinematics and Kinetics During Dynamic Motion” American Society of Biomechanics, 2018, **Rapid Podium**
2. Noginova, J., Bennett, H.J., **Samaan, M.A.**, Ringleb, S.I. “The effects of subtalar axis orientation on kinematics and kinetics during walking and running” International Foot and Ankle Biomechanics Conference, New York, NY, 2018. **Podium**
3. Rossi-deVries, J., Padoia, V., **Samaan, M.A.**, *et al* “Using Multidimensional Data Analysis to Identify Traits of Hip OA” International Society of Magnetic Resonance in Medicine, Paris, France, 2018. **Podium**
4. Shimizu, T., **Samaan, M.A.**, Tanaka, M.S., *et al*. “Limb Asymmetry at 6 Months can Predict Cartilage Degeneration at 3 Years Following ACL Injury and Reconstruction” American Academy of Orthopaedic Surgeons, New Orleans, LA, 2018. **Podium**

5. Shimizu, T., **Samaan, M.A.**, Tanaka, M.S., *et al.* “Abnormal Limb Kinematics at 6 Months May Predict Cartilage Degeneration at 3 Years Following ACL Injury and Reconstruction” Orthopaedic Research Society, New Orleans, LA, 2018. **Poster**
6. Shimizu, T., Cheng, Z., **Samaan, M.A.**, *et al.* “Can Sagittal Biomechanical Differences Lead to Joint Laxity after Anterior Cruciate Ligament Reconstruction?” Orthopaedic Research Society, New Orleans, LA, 2018. **Poster**
7. Popovic, T., **Samaan M.A.** Neumann, J., *et al.* “Altered Transverse Plane Kinematics in Patients with Symptomatic Hip Osteoarthritis During Stair Ambulation” Orthopaedic Research Society, New Orleans, LA, 2018. **Poster**
8. Inamdar, A., **Samaan, M.A.**, Zhang, A.L., *et al.* “Altered Lower Extremity Kinetics in Femoroacetabular Impingement Patients” Orthopaedic Research Society, New Orleans, LA, 2018. **Poster**
9. **Samaan, M.A.**, Zhang, A.L., Neumann, J., *et al.* “Abnormal Muscle Forces During Gait are Related to Cartilage Health after Hip Arthroscopy in Femoroacetabular Impingement Patients” UCSF Radiology Symposium, San Francisco, CA, 2017. **Podium**
10. **Samaan, M.A.**, Zhang, A.L., Neumann, J., *et al.* “Abnormal Muscle Forces During Gait are Related to Cartilage Health after Hip Arthroscopy in Femoroacetabular Impingement Patients” American Society of Biomechanics Annual Meeting, Boulder, CO, 2017. **Podium**
11. Bolcos, P.O., Mononen, M.E., Mohammadi, A., Tanaka, M., **Samaan, M.**, *et al.* “Comparison between Kinetic and Kinetic-Kinematic Driven Knee Joint Models” European Society of Biomechanics, Sevilla, Spain, 2017. **Podium**
12. **Samaan, M.A.**, Zhang, A.L., Gallo, M.C., *et al.* “Early Effects of Hip Arthroscopy on Articular Cartilage Composition in Femoroacetabular Impingement Patients” Osteoarthritis Research Society International. Las Vegas, NV, 2017 **Poster**
13. **Samaan, M.A.**, Pedoia, V., Zhang, A.L., *et al.* “T_{1ρ} Radial Heterogeneity is a Distinctive Feature of Cartilage Delamination in Femoroacetabular Impingement Patients” Osteoarthritis Research Society International. Las Vegas, NV, 2017 **Poster**
14. **Samaan, M.A.**, Pedoia, V., Zhang, A.L., *et al.* “A Novel Approach to Detection of Acetabular Cartilage Delamination in Patients with Femoroacetabular Impingement” Orthopaedic Research Society. San Diego, CA, 2017 **Poster**
15. **Samaan, M.A.**, Zhang, A.L., Gallo, M.C., *et al.* “Analysis of Gait Mechanics during Walking and T2 Relaxation Times in Femoroacetabular Impingement Patients after Hip Arthroscopy” Orthopaedic Research Society. San Diego, CA, 2017 **Poster**
16. Leung, L.J., **Samaan, M.A.**, Tanaka, M.S., *et al.* “Gait Mechanics 1 Year After ACL Reconstruction are Associated with Longitudinal Knee Cartilage Degeneration” Orthopaedic Research Society. San Diego, CA, 2017 **Poster**

17. Sawyer, K., **Samaan, M.A.**, Majumdar, S., *et al* “Altered Joint Kinetics in Patellofemoral Joint Osteoarthritis Progression During Sit-to-Stand” Combined Sections Meeting. APTA. San Antonio, TX, 2017 **Poster**

18. **Samaan, M.A.**, Schwaiger, B.J., Gallo, M.C., *et al* “Altered Joint Loading During Gait is Associated with Hip Joint Abnormalities in FAI Patients”. International Society of Hip Arthroscopy, San Francisco, CA, 2016 **Podium**

19. **Samaan, M.A.**, Weinhandl, J.T., Hans, S.A., *et al* “Estimation of Anterior Cruciate Ligament Loading Under Various Levels of Neuromuscular Fatigue Using Musculoskeletal Simulations”. American Society of Biomechanics Annual Meeting, Raleigh, NC, 2016 **Thematic Poster**

20. **Samaan, M.A.**, Schwaiger, B.J., Gallo, M.C., *et al* “Sagittal Plane Joint Loading During Gait is Associated with Hip Joint Abnormalities in Femoroacetabular Impingement Patients”. American Society of Biomechanics Annual Meeting, Raleigh, NC, 2016 **Podium**

21. **Samaan, M.A.**, Facchetti, L., Tanaka, M.S., *et al* “Altered Lower Extremity Coordination Variability During a Sidestep Cut in ACL-Reconstructed Patients as an Effect of Surgical Reconstruction and Knee Osteoarthritis Progression”. Osteoarthritis Research Society International, Amsterdam 2016. **Poster**

22. **Samaan, M.A.**, Kumar, D., Schwaiger, B.J., *et al* “Patients with Hip Osteoarthritis Progression Demonstrate Altered Sensory Perception and Lower Extremity Kinematics”. Osteoarthritis Research Society International, Amsterdam 2016. **Poster**

23. **Samaan, M.A.**, Gallo, M., Link, T.M., *et al.* “Baseline Hip Joint Kinematics During Walking are Associated with Hip Osteoarthritis Progression”. Annual Radiology Symposium, UC-San Francisco, 2015. **Poster**

24. **Samaan, M.A.**, Weinhandl, J.T., Hans, S.A., *et al.* "Analytical Models Used to Predict Fatigue in OpenSim". World Congress of Biomechanics, Boston, MA, 2014. **Poster**

25. **Samaan, M.A.**, Cortes, N., Hoch, M., *et al.* “The Effects of Neuromuscular Fatigue on Coordination Variation”. American Society of Biomechanics Annual Meeting, Gainesville, FL, 2012 **Poster**

26. Osmanzada, H., Ringleb, S.I., **Samaan, M.A.**, *et al.* “Kinematic Analysis of Gesture in Aphasia”. American Society of Biomechanics Annual Meeting, Gainesville, FL, 2012 **Poster**

27. Greska, E., Cortes, N., Ringleb, S., **Samaan, M.**, *et al.* “The Effects of Leg Dominance, Neuromuscular Training, and Fatigue on Bilateral Lower Extremity Kinematics”. American Society of Biomechanics Annual Meeting, Gainesville, FL., 2012 **Poster**

28. Greska, E., Cortes, N., **Samaan, M.**, *et al.* “The Effects of Fatigue and Leg Dominance on Hip and Knee Neuromechanics”. VI ACL Research Retreat, Greensboro, NC, 2012. **Poster**

29. Choisne, J., Ringleb, S.I., **Samaan, M.**, *et al.* "Understanding the Effects of Lateral Ligament Sectioning on the Stability of the Ankle and Subtalar Joint Using Euler Angles and the Rotation about a Helical Axis". American Society of Biomechanics Annual Meeting, Providence, RI, 2010. Poster
30. **Samaan, M.**, Ringleb, S.I., Choisne, J. *et al.* "Examining the Kinematics of the Knee During a Side Step Cutting Task Using the Helical Axis Method". American Society of Biomechanics Annual Meeting, Providence, RI, 2010. **Poster**
31. **Samaan, M.**, Roberson, D.L., Rogers, W., *et al.* "Development of a Three Dimensional Kinematic Speech Model". Biomedical Engineering Society Annual Meeting. Pittsburgh, PA, 2009. **Poster**

Research Mentor

High School Students:

- Layla Souza, *Effects of Hip Joint Center Calculation on Hip joint Kinematics and Kinetics* (2017)
- Solomon Joseph, *Development and Validation of a Mobile-Based Application for the Chair-Rise Test* (2017)
- Ankita Inamdar, *Altered Joint Loading Distribution During Bilateral Squats after Hip Arthroscopy in FAI Patients* (2017)
- Victoria Louie, *Investigation of Hip Joint Mechanics in FAI Patients after Hip Arthroscopy* (2016)

Undergraduate Students:

- Carla Kinnunen, University of San Diego, *Muscle Fat Infiltration in FAI Patients is related to Severity of Hip Joint Abnormalities and Patient Reported Outcomes* (2017)
- Halil Beqaj, *Hip Joint Mechanics During Stair Ambulation in FAI Patients* (2017 - 2018)
- Katherine Sawyer, UC Davis: *Distal Joint Compensations During a Sit-to-Stand Task in Patellofemoral OA Progressors* (2015-2016)
- Widny Nazaire, San Francisco State University NIH-Bridges Program: *Hip Joint Kinematics and Kinetics of Patients with Femoracetabular Impingement and Healthy Controls During Walking* (2014-2015)
- Jonathon Coulter, Liang Dong, Chris Holmes and Haroon Osmanzada, ODU Senior Design: *Knee Loading Device for In-Vitro Knee Joint Kinematic Assessment* (2010-2011)
- Stephanie McCarthy, ODU Independent Research Scholar, *Kinematic Analysis of Gesture Following Word Retrieval Training for Aphasia* (2011)

Graduate Students:

- Tomohiro Shimizu, Hokkaido University Dept. of Orthopaedic Surgery Visiting Scholar, *Longitudinal Effects of ACL Reconstruction on Knee Joint Mechanics and Health* (2016 – 2018)
- Trevor Grace, UC San Francisco Dept. of Orthopaedic Surgery Resident, *Effects of Hip Arthroscopy on Hip Joint Mechanics and Cartilage Health* (2016-Current)
- Gautam Adusumilli, Washington University School of Medicine in St. Louis, *Development and Validation of a Mobile-Based Application for the Chair-Rise Test* (2017)
- Lawrence Leung, University of Vermont Medical School, *Gait Mechanics at One Year after ACL-reconstruction are Associated with Longitudinal Patellar Cartilage Degeneration* (2016)

- Haroon Osmanzada, ODU Master's Thesis, *Understanding Scapular Kinematics of Gestures Following Word Retrieval Training in the Aphasiac Population* (2012-2014)
- Jonathon Coulter, ODU Master's Thesis, *Dynamic Model of Sailors Descending a Navy Ship Ladder* (2012-2013)