

Stephen M. Okajima

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Education **Boston University – College of Engineering**

- B.Sc. Biomedical Engineering – May 2014
- B.Sc. Computer Engineering – May 2014

Boston University – School of Medicine

- MsMS. Masters of Medical Science – September 2015 - May 2017

Experience **Software Developer – Google Glass (Boston, MA)**

October 2013 – Present

Designing paradigm for clinical and surgical visits for use in current EMR systems.

Teamed with surgeons in Boston Metro area for application development and clinical advice.

Volunteer – Public Health Brigades

Global Brigades (Honduras)

May 2011

Educated local population about the importance of healthy habits and sanitation

Built water supplies, latrines, and flooring to improve living conditions of residents

Research **Biomedical Engineer – (Previously Research Student Intern)** Experience **Center for Advanced Orthopaedic Studies**

Beth Israel Deaconess Medical Center, Harvard Medical School (Boston, MA)

September 2013 – (March 2015) – Present

Designed, implemented, and tested new robotic systems for biomechanical research. CT-based imaging analysis and animal modeling. Designed medical implants and devices for use in orthopedics and third-world or crisis situations.

Taught and advised undergraduate students in study design, system design. Engaged in study ideation with surgical and senior faculty. Some, but not all of the study topics are outlined below.

1. Implementation of Variable Muscle Loading for a Shoulder Biomechanics Testing System (September 2013 – Present)
 - Designed robotic system tasked to variably load individual isolated muscles throughout simulated movement to evaluate glenohumeral kinetics and subacromial contact pressures.
 - Integrated physiologically relevant muscle 'activation' to more accurately evaluate the biomechanics and pathologies related to shoulder kinetics.
2. A Comparative Biomechanical Study of the Surgical Reconstruction of the Scapholunate Ligament (April 2014 – Present)
 - Designed robotic system tasked to both move and variably load individual isolated muscles throughout simulated wrist motions.
 - Evaluate the efficacy of capsulodesis, tendonosis, and front-back looping surgical repair methods in scapholunate ligament repair.
3. An Evaluation of Screw-Tunnel Divergence using the VersiTomic Flexible Reamer System for ACL Reconstruction (May 2014 – Sept 2015)
 - Evaluate differences in bone-plug divergence between the femoral tunnel and interference screw used for bone-patellar tendon-bone ACL reconstruction performed with the standard VersiTomic instrumentation and tie VersiTomic ISI.
4. Biomechanical Analysis of Tibiofemoral Contact Pressures After Novel Repair of Meniscus Horizontal Cleavage Tears (August 2013 – September 2014)
 - Evaluation of an arthroscopic horizontal meniscal cleavage tear repair system to restore tibiofemoral contact pressures to that of an intact meniscus through axial loading at various degrees of tibiofemoral flexion.
 - Study the efficacy of the repair compared to current methods to show a viable method for both meniscal and joint preservation.

5. In Vivo Kinetic Evaluation of An Adhesive Capsulitis Model in Rats (July 2014 – June 2015)
 - Designed robotic system tasked to accurately move between either a fixed rotational distance or a predetermined torque measurement.
 - Evaluation of suggested rat model of adhesive capsulitis and its relation to clinical experiences.
6. An Evaluation of Backscattered Electrons (BSE) and Micro CT for Bone Density Measures (December 2013 – Present)
 - Developed image analysis tool for BSE and uCT image analysis.
 - Comparison between accuracy of methods (BSE and CT) for determining bone density.
7. Arthroscopic Restoration of Femoroplasty (July 2014 – Present)
 - Designed medical implant designed for contralateral hip fracture prevention for osteoporosis.
 - Designed medical implant deployment mechanism for arthroscopic procedures.
 - Evaluated efficacy of implant; restoration of osteoporotic hip returned to healthy controls (preliminary)
8. Design of Low-Cost Alternatives to Life Sustaining and Rehabilitation Devices (February 2016 – Present)
 - Designing a respirator that can be used in crisis or low-socioeconomic areas.
 - Designing a negative pressure wound vacuum that can be used in crisis or low-socioeconomic areas.

Neuroimaging Analyst – Research Assistant

Translational Research Center for TBI and Stress Disorders

VA Boston Healthcare System, Harvard University (Boston, MA)

October 2014 – April 2015

Performed data analysis, statistics for neuroimaging studies. Educated investigators in neuroimaging, data analysis, and methods of study. Streamlined and created image processing methods and programs.

1. Evaluation of the Relationship between Spirituality and Religiosity in Parkinson’s Patients (October 2014 – April 2015)
 - Investigate functional connectivity in putamen and caudate with surface regions with relation to Parkinson’s severity and Brief Multidimensional Measure of Religiousness/Spirituality Score
2. Investigation of the Amygdala and REM Behavior Disorder (RBD) in Patients with Parkinson’s Disease (October 2014 – April 2015)
 - Evaluate functional connectivity between Amygdala and surface regions in patients with Parkinson’s suffering from RBD.

Neuroimaging Research Student Intern

MGH/HST Martinos Center for Biomedical Imaging

Massachusetts General Hospital, Harvard-MIT Health Sciences and Technology (Boston, MA)

May 2013 – May 2014

Performed data and statistical analysis for neuroimaging studies. Streamlined and created image processing methods and programs.

1. Investigation of the Relationship of Cortical Thickness in Individuals with Alzheimer’s and the Mildly Cognitively Impaired (May 2013 – May 2014)
 - Analyzed, reconstructed, and processed MRI data in Freesurfer to perform GLM analysis.

Editorial Contributions

Ad-Hoc Reviewer for BioMed Central Journal for Musculoskeletal Disorders

Peer-reviewed Publications

1. Villa J., **Okajima S.**, Perez-Viloria M., Walley K.C., Nazarian A., Rodriguez E.K. An in vivo Kinetic Evaluation of an Animal Model for Adhesive Capsulitis. *Journal Shoulder Elbow Surgery*, 2015. pii: S10582746(15)00318-3. doi: 10.1016/j.jse.2015.06.015.
2. Beamer B.S., Walley K.C., **Okajima S.M.**, Manoukian O.S., Perez-Viloria M., DeAngelis J.P., Ramappa A.J., Nazarian A. Biomechanical Analysis of Tibiofemoral Contact Pressures After Novel Repair of Meniscus Horizontal Cleavage Tears. *American Journal of Sports Medicine*, 2016. pii: S0749-8063(16)30706-X. doi: 10.1016/j.arthro.2016.09.004.

Abstracts and Presentations

1. Drazek M., Walley K.C., Perez-Viloria M.E., **Okajima S.**, Manoukian O.S., Masoudi A., Chiloyan A., Nair R.R., Steiner M., Nazarian A. *Evaluation of Screw-Tunnel Divergence and Graft Fixation Biomechanics using Flexible and rigid Reamer Systems for Anterior Cruciate Ligament Reconstruction*. Abstract and Poster to the Biomedical Engineering Society 2014 BMES Conference (San Antonio, TX)
2. Perez-Viloria M.E., **Okajima S.M.**, Masoudi A., Walley K.C., Manoukian O.S., Drazek M., Wing D.W., Steiner M.E., Nazarian A. *Rigid vs. Flexible Screwdriver for Femoral Interference Screw Placement: Comparison of Divergence and Fixation Strength*. Abstract accepted for *Orthopedic Research Society Annual Meeting 2015* (Las Vegas, NV).
3. Brandon Beamer, KC Walley, **Stephen Okajima**, Ohan Manoukian, Miguel Perez, Joseph DeAngelis, Arun Ramappa, Ara Nazarian. *Biomechanical Analysis of Tibiofemoral Contact Pressures After Novel Repair of Meniscus Horizontal Cleavage Tears*. Abstract accepted for the Orthopaedic Research Society Annual Meeting 2015 (Las Vegas, NV).
4. Rajan PV, **Okajima S**, Walley KC, Perez M, Nasr M, Manoukian OS, Williamson P, Nazarian A, Day CS. *A comparative biomechanical study of the scapholunate interosseous ligament*. Harvard Medical School Soma Weiss Day 2015. (Boston, MA).
5. Brandon Beamer, KC Walley, **Stephen Okajima**, Ohan Manoukian, Miguel Perez, Joseph DeAngelis, Arun Ramappa, Ara Nazarian. *Biomechanical Analysis of Tibiofemoral Contact Pressures After Novel Repair of Meniscus Horizontal Cleavage Tears*. Beth Israel Deaconess Medical Center Orthopedic Surgery Residency Thesis Defense 2015 (Boston, MA).
6. Liu C, Cohen D, Nair R, **Okajima S**, Walley KC, Masoudi A, Nasr MC, Perez-Viloria M, DeAngelis JP, Ramappa AJ, Nazarian A. *The Effect of Humeral Positioning on Glenohumeral and Subacromial Forces in a Cadaveric Model of Simulated Pitching*. The 41st Annual Northeast Bioengineering Conference. Biomedical Engineering Society. Rensselaer Polytechnic Institute 2015 (Troy, NY).
7. Williamson P.M, **Okajima S.M**, Harlow E.R, Walley K.C, Masoudi A, Perez M, Nasr M, Manoukian O.S., Ramappa A.J, DeAngelis J.P, Nazarian A. *The Effect of Capsular Integrity on Glenohumeral and Subacromial Forces and Kinematics in a Cadaveric Model of Abduction with Variable Loading*. Biomedical Engineering Society 2015 BMES Conference (Tampa, Florida).
8. Ethan R. Harlow, Kempland C. Walley, Patrick M. Williamson, Michael C. Nasr, MD, **Stephen M. Okajima**, Miguel Perez-Viloria, MD, Ara Nazarian, PhD, Arun J. Ramappa, MD, Joseph P. DeAngelis, MD. *A Biomechanical Evaluation of Type II and Type III Acromioclavicular Joint Injuries*. Orthopedic Research Society 2016 ORS Conference (Orlando, Florida).
9. Kempland C. Walley, Ethan R. Harlow, Patrick M. Williamson, Michael C. Nasr, MD, **Stephen M. Okajima**, Miguel Perez-Viloria, MD, Joseph P. DeAngelis, MD, Ara Nazarian, PhD, Arun J. Ramappa, MD. *The Effect of the Rotator Interval on Glenohumeral Kinematics During Abduction*. Orthopedic Research Society 2016 ORS Conference (Orlando, Florida).
10. Michael C. Nasr, MD, Ethan R. Harlow, Kempland C. Walley, Patrick M. Williamson, **Stephen M. Okajima**, Arun J. Ramappa, MD, Joseph P. DeAngelis, MD, Ara Nazarian. *Glenohumeral Joint Kinematics Following Shortened Clavicular Malunion*. Orthopedic Research Society 2016 ORS Conference (Orlando, Florida).
11. Amin Mohamadi, Jonathan Egan, Magdalena Nevett, Kenneth Ierardi, **Stephen Okajima**, Mark S. Vrahas , Edward K. Rodriguez, Ara Nazarian, Michael J. Weaver. *The Effect of Various Lateral Locking Plate Configurations on the Fixation Stiffness in Osteoporotic Femoral Sawbones*. 2017 Annual Meeting of the Orthopedic Research Society (San Diego, California).
12. **Stephen Okajima**, Caleb M. Yeung, Vahid Entezari, Vartan Vartanians, John Rennick, Vinay Goyal, Juan Villa-Camacho, Molly Vora, Ara Nazarian. *Use of Micro-computed Tomography to Quantify Tissue Mineral Density*. 2017 Annual Meeting of the Orthopedic Research Society (San Diego, California).

13. Arvind von Keudell, Amir Kachooei, Michael Nasr, Amin Mohamadi, **Stephen Okajima**, George Dyer, Ara Nazarian. *Biomechanical Properties of a New Intramedullary Suture Anchor Fixation Compared to Tension Band Wiring in Osteoporotic Olecranon Fractures*. 2017 Annual Meeting of the Orthopedic Research Society (San Diego, California).