

Mark Owen Papuga

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EDUCATION

University of Rochester

Rochester, New York | March 2011

Doctor of Philosophy in Biomedical Engineering

Thesis: “The Development of a Murine Model of Compression Induced Vertebral Degeneration with Associated Bone Marrow Edema”

Case Western Reserve University

Cleveland, Ohio | August 2004

Master of Science in Biomedical Engineering

Thesis: “Biomechanical Analysis of the Lateral Sliding Transfer”

Syracuse University

Syracuse, New York | May 2000

Bachelor of Science, with honors in Bioengineering

Thesis: “Quantification of Rhabdom Shedding in *Limulus polyphemus*”

Supplemental Courses

Good Laboratory Practices for Pre-clinical Trials

Malvern, Pennsylvania | September 2008

Center for Professional Development

Clinical Gait Analysis

Minneapolis, Minnesota | May 2006

Gillette’s Children’s Specialty Healthcare

EXPERIENCE

Northeast College of Health Sciences

Seneca Falls, NY

(Formerly New York Chiropractic College)

Dean, Frank J. Nicchi School of Continuing Education

September 2022 – Present

Director, Frank J. Nicchi School of Continuing Education

April 2019 – September 2022

- Develop high quality postgraduate curriculum, identify corporate partners, Manage budget and staffing, identify data efficacy and improve data analysis, Implement data driven management decisions.

Associate Professor, Research Department

April 2016 – April 2019

- Psychomotor skills associated with the high velocity low amplitude thrust, 3D printed foot orthotic interventions, and patient reported outcome measurements of physical function, pain interference and depression

Assistant Professor, Research Department

January 2011 – April 2016

- Clinical gait analysis, posture and balance, foot orthotic interventions, MRI investigations of low back pain, fMRI investigation of central pain mechanisms, functional assessment outcomes measures

Research Engineer

July 2004 – Jan 2011

- Primary Engineer for both Gait Lab and Neurophysiology Lab

Committee Involvement

Committee on Faculty Appointments & Promotions | 2024-Present
Institutional Review Board Member | 2004 – 2019; 2023-Present
Institutional Review Board Chair | 2012 –2019; 2024 - Present
Faculty Senate Member | 2011 - 2019
Faculty Handbook Committee | 2013 – 2019: Chair (2015 – 2018)
Faculty Awards Committee | 2013 – 2014: Chair (2014 – 2019)
Judicial Committee | 2013 - Present
Annual Northeast Research Symposium | 2004 – 2019
Campus Research Committee | 2005 – Present

University of Rochester

Rochester, NY

Adjunct Professor, Biomedical Engineering Department

2014 – 2019

- Director of a competitive paid summer internship program developing biomechanics laboratory skills for undergraduates interested in academic research

Adjunct Professor, Center for Musculoskeletal Research

2012 – 2019

- Clinical gait analysis, MRI investigations of low back pain, fMRI investigation of central pain mechanisms, functional assessment outcomes measures, animal models of osteoarthritis and rheumatoid arthritis

Research Associate, The Center for Musculoskeletal Research

2007 – 2011

- Material testing, animal preparation, MRI, Micro CT, histology, animal recovery surgeries, data analysis, and manuscript preparation

Canandaigua VA Medical Center

2012 – 2019

VA Research WOC

- Without compensation (WOC) appointment at the Veterans Administration medical center in Canandaigua NY to oversee and assist in several research projects involving patient reported outcomes assessment, physical function outcomes, and clinical gait analysis

TEACHING EXPERIENCE

Northeast College of Health Sciences

Seneca Falls, NY

Lead Instructor, Graduate Level, Fundamentals of Research Literacy

Spring 2022 – Present

Lead Instructor, Graduate Level, Issues in Chiropractic Research

Fall 2015 – Present

Lead Instructor, Graduate Level, Instrumented Biomechanics

Fall 2013 – 2016

Lead Instructor, Graduate Level, Human Physiology

Spring 2010

Laboratory Instructor, Graduate Level, Principles of Human Movement

Fall 2007

Analysis

AWARDS

Faculty Excellence Award (Research & Scholarly Activity) | 2013, 2018 | Northeast College

Meliora Award (Team Award) | University of Rochester

NYCC Pilot Research Project Award | NYCC

Integrative Graduate Education and Research Traineeship | National Science Foundation

CASE Prime Fellowship | Case Western Reserve University

Louis N. DeMartini Award for Undergraduate Research | Syracuse University

Publications

Fiore A, **Papuga MO** “Multimodal Care of a Patient With Functional Movement Disorders Following a Motor Vehicle Accident: A Case Report”, *Journal of Chiropractic Medicine*, 2023

Santiago, J., **Papuga, M.**, Santiago, J., Post, A., & DiMond, M. (2022). The Utilization and Effects of Chiropractic Care During the COVID-19 Pandemic: A Survey of Northeast Chiropractors. *Journal of Contemporary Chiropractic*, 5(1), 251–258.

Dagher GC, **Papuga MO**. “The Effect of Resisted Trunk Rotation Exercise with and without Double-Pulse Breathing Technique on Hockey Shot Velocity” *Journal of Chiropractic Medicine* 2019;17(4)244-255

Bernstein DN, Bakhsh W, **Papuga MO**, Menga EN, Rubery PT, Mesfin A. “An Evaluation of PROMIS in Patients With Primary or Metastatic Spine Tumors”. *Spine (Phila Pa 1976)*. 2019;44(10):747-752.

David N. Bernstein, **M. Owen Papuga**, James O Sanders, Paul T. Rubery Jr., Emmanuel N. Menga, Addisu Mesfin, “Evaluating the Performance of PROMIS in Adult and Pediatric Spinal Deformity Patients”. *Spinal Deformity* 2019 7(1):118-124

Raymond Chen, **M. Owen Papuga**, Gregg Nicandri, Richard J Miller, Ilya Voloshin “Preoperative PROMIS Scores Predict Postoperative Outcome in Total Shoulder Arthroplasty Patients” *Journal of Shoulder and Elbow Surgery* 2019;28(3):547-554

Paul T. Rubery, Jeff Houck, Addisu Mesfin, Robert Molinari, **M. Owen. Papuga** “Preoperative PROMIS Scores Assist in Predicting Early Postoperative Success in Lumbar Discectomy” *Spine* 2019; 44(5):325-333

Raymond Chen, **M. Owen Papuga**, John Goldblatt, Robert Bronstein, Gregg Nicandri, Lucien Rouse, Ilya Voloshin Michael Maloney “Preoperative PROMIS Scores Predict Postoperative Outcomes after Primary ACL Reconstruction” *Orthopaedic Journal of Sports Medicine* 2018: 6 (5)

Papuga MO, Barnes AL. “Correlation of PROMIS CAT instruments with Oswestry Disability Index in Chiropractic Patients” *Complementary Therapies in Clinical Practice* 2018;31:85-90.

Papuga MO ; Dasilva C; McIntyre A; Mitten D; Kates S; Baumhauer JF “Large Scale Clinical Implementation of PROMIS Computer Adaptive Testing with Direct Incorporation into the Electronic Medical Record”. *Health Systems* (2017). <https://doi.org/10.1057/s41306-016-0016-1>

Morrison A, **Papuga MO**. “Kinematic Analysis of the Lumbar Spine During the Pull Phase of the Luge Start” *International Journal of Sport Studies*. 2016: 6 (7), 423-432

Papuga MO, Mesfin A, Molinari R, Rubery PT. “Correlation of PROMIS Physical Function and Pain CAT instruments with Oswestry Disability Index and Neck Disability Index in Spine Patients”. *Spine (Phila Pa 1976)*. 2016 Jul 15.

Papuga MO, Cambron J. “Foot orthotics for low back pain: The state of our understanding and recommendations for future research.” *Foot (Edinb)*. 2016 Mar;26:53-7.

Charles W. Gay, DC; **Mark O Papuga, PhD**; Mark D Bishop, PT PhD; Paul Dougherty, DC, “The frequency and reliability of cortical activity using a novel strategy to present pressure pain stimulus over the lumbar spine” *J Neurosci Methods*. 2015 Jan 15;239:108-13

M. Owen Papuga; Jeanmarie R. Burke; Paul E Dougherty. “The Reliability of a Novel MRI Compatible Electro-Pneumatic Device for Delivering a Painful Pressure Stimulus over the Lumbar Spine.” *Somatosensory and Motor Research*. Somatosens Mot Res. 2015 Mar;32(1):51-60.

M. Owen Papuga; Christopher A. Beck; Stephen L. Kates; Edward M. Schwarz; Michael D. Maloney. “Validation of GAITRite and PROMIS as High-Throughput Physical Function Outcome Measures Following ACL Reconstruction”, *Journal of Orthopaedic Research*. 2014 Jun;32(6):793-80

M. Owen Papuga and Jeanmarie R. Burke, “Rehabilitative footwear: Importance of comfort.” *Lower Extremity Review*. 2012 June (invited review)

Jeanmarie R. Burke and **M. Owen Papuga**, “Effects of Foot Orthotics on Running Economy: Methodological Considerations” *Journal of Manipulative and Physiological Therapeutics*. 2012 May;35(4):327-36

M. Owen Papuga, Edmund Kwok, Zhigang You, Paul T. Rubery, Paul E. Dougherty, Gloria Pryhuber, Christopher A. Beck, Matthew J. Hilton, Hani A. Awad, Edward M. Schwarz “TNF is required for the induction but not the maintenance of compression-induced BME signals in murine tail vertebrae: limitations of anti-TNF therapy for degenerative disc disease” *Journal of Orthopaedic Research*. 2011 Sep;29(9):1367-74

M. Owen Papuga and Jeanmarie R. Burke, “The Reliability of the Associate Platinum Digital Foot Scanner in Measuring Previously Developed Footprint Characteristics: A Technical Note” *Journal of Manipulative and Physiological Therapeutics*. 2011 Feb; 34(2):114-8

M. Owen Papuga; Steven T. Proulx; Edmund Kwok; Zhigang You; Paul T. Rubery; Paul E. Dougherty; Matthew J. Hilton; Hani A. Awad and Edward M. Schwarz. “Chronic axial compression of the mouse tail segment induces MRI bone marrow edema changes that correlate with increased marrow vasculature and cellularity” *Journal of Orthopaedic Research*; 2010 Sep;28(9):1220-8.

David G. Reynolds, Saad Shaikh, **M. Owen Papuga**, Amy L. Lerner, Regis J O’Keefe, Edward M. Schwarz, Hani A. Awad “Micro-CT-Based Measurement of Cortical Bone Graft-to-Host Union.” *Journal of Bone and Mineral Research* 24(5):899-907. (2009)

T.K. Koo, **M.O. Papuga**. “A computer aided method for closed reduction of diaphyseal tibial fracture using projection images: A feasibility study” *Computer Aided Surgery* 10:1-13 (2009)

Steven T. Proulx, Edmund Kwok, Zhigang You, **M. Owen Papuga**, Christopher A. Beck, David J. Shealy, Laura M. Calvi, Christopher T. Ritchlin, Hani A. Awad, Brendan F. Boyce, Lianping Xing, and Edward M. Schwarz “Elucidating Bone Marrow Edema and Myelopoiesis in Murine Arthritis Using Contrast-Enhanced Magnetic Resonance Imaging.” *Arthritis Rheum.* 58(7):2019-29(2008)

Proulx ST, Kwok E, You Z, **Papuga MO**, Beck CA, Shealy DJ, Ritchlin CT, Awad HA, Boyce BF, Xing L, Schwarz EM. (2007) Longitudinal assessment of synovial, lymph node, and bone volumes in inflammatory arthritis in mice by in vivo magnetic resonance imaging and microfocal computed tomography. *Arthritis Rheum.*, 56, 4024-4037.

Sacunas, RB, **Papuga, MO**, Malone MA, Pearson AC Jr, Marjanovic M, Stroope DG, Weiner WW, Chamberlain SC, Battelle BA., "Multiple Mechanisms of Rhabdom Shedding in the Lateral Eye of *Limulus polyphemus*", *The Journal of Comparative Neurology* 449:26-42 (2002).

Abstracts & Presentations

Raymond Chen, **M. Owen Papuga**, Gregg Nicandri, Richard J Miller, Ilya Voloshin , "Preoperative PROMIS Scores Predict Postoperative Outcome In Total Shoulder Arthroplasty Patients" *ISAKOS Congress*, Cancun, Mexico May 12-16, 2019.

Raymond Chen, **M. Owen Papuga**, Gregg Nicandri, Richard J Miller, Ilya Voloshin "Preoperative PROMIS Scores Predict Postoperative Outcomes After Arthroscopic Bankart Repair" *ISAKOS Congress*, to be held in Cancun, Mexico May 12-16, 2019.

Paul T. Rubery, Jeff Houck, Addisu Mesfin, Robert Molinari, **M. Owen. Papuga** "Preoperative PROMIS Scores Predict Postoperative Success in Lumbar Discectomy" *Scoliosis Research Society annual meeting* 2017, September 6-9 Philadelphia PA.

Addisu Mesfin, Emmanuel N. Menga, **M. Owen Papuga**, Paul T. Rubery Jr., David N. Bernstein "Evaluating PROMIS in Spine Tumor Patients" *North American Spine Society 32nd Annual Meeting* 2017, October 25-28 Orlando FL.

Addisu Mesfin, David N. Bernstein, **M. Owen Papuga**, James O. Sanders, Paul T. Rubery Jr. "Correlation of PROMIS with SRS Questionnaire Domains in Adult and Pediatric Spinal Deformity Patients" *North American Spine Society 32nd Annual Meeting* 2017, October 25-28 Orlando FL.

Addisu Mesfin, Emmanuel N. Menga, **M. Owen Papuga**, Paul T. Rubery Jr., David N. Bernstein "Evaluating PROMIS in Spine Tumor Patients" *24th International Meeting on Advanced Spine Techniques (IMAST)*, July 12-15, 2017 in Cape Town, South Africa.

Owen Papuga, Michael Maloney, Allison McIntyre, Chris DaSilva, David Mitten, John Goldblatt, Robert Bronstein, Gregg Nicandri, Lucien Rouse, Ilya Voloshin, The use of PROMIS CAT Physical function pre-surgical scores to predict recovery and establish pre-surgical cut-off values. Accepted for AOSSM 2017 Annual Meeting July 20-23. Toronto, Canada

Owen Papuga, Michael Maloney, Allison McIntyre, Chris DaSilva, David Mitten, John Goldblatt, Robert Bronstein, Gregg Nicandri, Lucien Rouse, Ilya Voloshin, Judith Baumhauer. The use of PROMIS CAT Physical function pre-surgical scores to predict recovery from ACL reconstruction surgery. PROMIS Health Organization 2nd Annual Conference 2016, October 23-24th.

Owen Papuga, Michael Maloney, Allison McIntyre, Chris DaSilva, David Mitten, John Goldblatt, Robert Bronstein, Gregg Nicandri, Lucien Rouse, Ilya Voloshin, Judith Baumhauer. The use of PROMIS CAT Physical function pre-surgical scores to predict recovery from ACL reconstruction surgery. International Society for Quality of Life Research 23rd Annual Conference 2016, October 19-22nd.

M. Owen Papuga, PhD, Allison McIntyre, BS, Christopher Dasilva, BS, David Mitten, MD and Judith Baumhauer, MD; Large Scale Clinical Implementation of Promis Computer Adaptive Testing with

Direct Incorporation into the Electronic Medical Record. Poster Presentation at AcademyHealth's 2016 Annual Research Meeting.

Papuga MO, Mesfin A, Molinari R, Rubery PT. Correlation of PROMIS Physical Function and Pain CAT instruments with Oswestry Disability Index and Neck Disability Index in Spine Patients. Platform presentation at 2015 North American Spine Society Meeting 10/14/15.

Papuga MO, Meess KM, Giordano BD, Elfar JC, Voloshin I, Kates SL, Thiele R, Schwarz EM, Maloney MD. Correlation of PROMIS Physical Function CAT with CONSTANT shoulder, ASES and Reaching Task Kinematic Analysis in Patients Who Have Undergone Rotator Cuff Repair Surgery. Presented at: International Society of Arthroscopy, Knee Surgery and Orthopaedic Sports Medicine. Lyon, France June 7-11, 2015.

Papuga MO; Meess KM; Giordano BD; Elfar JC; Voloshin, I; Kates SL; Thiele, R; Schwarz EM; Maloney MD. "Correlation of Vascular and Anatomical Response with Physical Function Outcome measures: A Pilot Study in Patients Who Have Undergone Rotator Cuff Repair Surgery" Poster presentation at Orthopedic Research Society 60th Annual Meeting 2014

Papuga MO; Beck CA; Kates SL; Schwarz EM ;Maloney MD. "The Use of GAITRite and PROMIS as Physical Function Outcome Measures for ACL Reconstruction" Poster presentation at Orthopedic Research Society 60th Annual Meeting 2014

Papuga MO, Schwarz EM, Maloney, MD, "Validation of GAITRite and PROMIS as High-Throughput Physical Function Outcome Measures of ACL Repair" Poster presentation at Orthopedic Research Society 59th Annual Meeting 2013

Papuga MO, Kwok E, Rubery P, Dougherty PE, Hilton MJ, Awad HA, Schwarz EM. "TNF is required for the induction but not the maintenance of compression-induced BME signals in murine tail vertebrae: limitations of anti-TNF therapy for degenerative disc disease." Poster presentation at Orthopedic Research Society 57th Annual Meeting 2011

Papuga, M, Hilton M, Awad H, Schwarz E. "Chronic axial compression of the mouse tail segment induces MRI bone marrow edema changes that correlate with increased marrow vasculature and cellularity" (ORS2010-0221) Podium presentation at Orthopedic Research Society 56th Annual Meeting 2010

Papuga MO, Dougherty PE, Awad H, Schwarz EM. "A compression model of vertebral degeneration elicits bone marrow edema signal on CE-MRI", (ORS2009-0398) Poster presentation at Orthopedic Research Society 55th Annual Meeting 2009.

T.K.K. Koo¹, **M.O. Papuga**, J.A. Taylor A.F.T. Mak. "X-ray Based Computer- Aided Correction of Fracture Deformity" *Proc ISB* 2007. The 7th Annual Meeting of the International Society for Computer Assisted Orthopaedic Surgery.

Dougherty PE, **Papuga MO**, Awad H, Schwarz EM. "The Effect of a Manipulative-like Force on Inflammatory Changes in a Transgenic Mouse Tail: A Chiropractic Research Model", *New York Chiropractic College Research Symposium* 2007.

Burke JR, **Papuga MO**. “Motor Learning and Drop Jump Techniques; Effects of Orthotic Intervention on Neuromuscular Adaptations and Performance Gains”, *New York Chiropractic College Research Symposium 2006*.

Papuga MO, Memberg WD, Crago PE. “Biomechanics of Sliding Transfer: Feasibility of FES Assistance”
Proc. 4th Biannual ISG meeting, June 17-18 (2002)

Papuga MO, Memberg WD, Crago PE. “The Biomechanics of a Sliding Transfer”
Annual ANCR Day, (2001)

Sacunas, R.B., **Papuga, M.O.**, et al., “Multiple Mechanisms of Rhabdom Shedding in the Lateral Eye of *Limulus polyphemus*”, The *ARVO 2000 Annual meeting* (2000).