

# DANIEL ORAVEC | curriculum vitae

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## Education

- **Master of Science – Biomedical Engineering** 2007 – 2009  
Tampere University of Technology – Tampere, Finland  
Major subject: Medical Physics  
Minor subject: Biomaterials  
Thesis: Proximal Femur FEM Representing Different Exercise Loading Types  
Advisors: Harri Sievänen, Ph.D., Hannu Eskola, Ph.D
- **Bachelor of Science – Biomedical Engineering** 2003 – 2007  
Michigan Technological University – Houghton, MI, USA

## Employment

- **Senior Research Engineer** – Section of Biomechanics, July 09 – Present  
Henry Ford Hospital, Bone & Joint Center, Detroit, MI
- **Teaching Assistant** – Tampere University of May 08 – June 09  
Technology, Tampere, Finland
- **Software Testing Engineer** – LionBRIDGE Testing May 08 – June 09  
Services Oy, Tampere, Finland
- **Research Assistant** – Section of Anatomy, May 06 – Aug 06  
Henry Ford Hospital, Bone & Joint Center, Detroit, MI May 05 – Aug 05

## Honors & Awards

- **Winner, Best Poster, Imaging-Image Analysis Category,**  
*15th Annual Henry Ford Health System Research Symposium, 2018*  
“Vertebral displacement measurement using tomosynthesis based digital volume correlation in vitro and in vivo”
- **Collaborator, 1st Place Resident Research Paper,**  
*Detroit Academy of Orthopaedic Surgeons, 2014*  
“Cerclage Fixation for Cementless Total Hip Arthroplasty Complicated by Intraoperative Vancouver B1 Periprosthetic Fractures: A Biomechanical Analysis”
- **Winner, Best Poster, Imaging-Image Analysis Category,**  
*8th Annual Henry Ford Health System Research Symposium, 2011*  
“The Effect of Endplates on Cancellous Bone Strain Distribution in Uniaxially Compressed Rat T5 Vertebrae as Assessed by Digital Volume Correlation”
- **Board of Control Scholarship,** Michigan Technological University, 2003-2007
- **Housing Scholarship,** Tampere University of Technology, 2005
- **MEAP (Michigan Educational Assessment Program) Scholarship,** 2003
- **Finland-U.S. Senate Youth Exchange 2003 Scholarship,** Youth for Understanding, 2003

## **Service and Activities**

### **Ad Hoc Reviewer for Journals**

- Journal of Biomechanics, 2020-Present
- Biomedical Physics & Engineering Express, 2020-Present

### **Licenses & Memberships**

- Orthopaedic Research Society, 2010-Present

### **Conference Presentations**

- **Podium presentation**, 2021 Annual Meeting of the Orthopaedic Research Society, Long Beach, CA.  
Spine: “Strains Measured From Digital Tomosynthesis Based Digital Volume Correlation Correlate With Those From Microcomputed Tomography In Human Vertebrae”
- **Podium presentation**, 2020 Annual Meeting of the Orthopaedic Research Society, Phoenix, AZ.  
Spine – Structure, Function, and Imaging (Session 50): “Strains Measured Using Tomosynthesis-based Digital Volumes Correlation Are Detectable Under Load And Reflect Age-related Changes In Human Vertebral Bone”
- **Podium presentation**, 2015 Annual Meeting of the Orthopaedic Research Society, Las Vegas, NV.  
Diagnostic Imaging: From Spine to Cartilage (Session 21): “Digital tomosynthesis and high resolution computed tomography as clinical tools for vertebral endplate topography measurements: comparison with microcomputed tomography”

### **Peer-reviewed Publications (19)**

- **Oravec, D.**, Drost, J., Zuel, R., Flynn, M.J., Yeni, Y.N. (2021). Assessment of Intravertebral Mechanical Strains and Cancellous Bone Texture Under Load Using a Clinically Available Digital Tomosynthesis Modality. *Journal of Biomechanical Engineering*, *In Press* (DOI: 10.1115/1.4051280).
- Yeni, Y.N., **Oravec, D.**, Drost, J., Bevins, N., Morrison, C., Flynn, M.J. (2021). Bone health assessment via digital wrist tomosynthesis in the mammography setting. *Bone*, 144: 115804(1-10).
- **Oravec D.**, Zuel R., Flynn M.J., Yeni Y.N. (2020). Vertebral Stiffness Measured via Tomosynthesis-Based Digital Volume Correlation is Strongly Correlated with Reference Values from Micro-CT-Based DVC. *Medical Engineering & Physics*, 84: 169-173.
- Yeni Y.N., Baumer T., **Oravec D.**, Basheer A., Bey M.J., Bartol, S.W., Chang, V. (2020). Correlation of neural foraminal motion after surgical treatment of cervical

radiculopathy with long-term patient reported outcomes. *Journal of Spine Surgery*, 6(1): 18-25.

- Azad S., **Oravec D.**, Baumer T., Schildcrout A., White P., Basheer A., Bey M.J., Bartol S.W., Chang V., Yeni Y.N. (2020). Dynamic foraminal dimensions during neck motion 6.5 years after fusion and artificial disc replacement. *PLOS ONE*, 15(8): e0237350.
- **Oravec D.**, Flynn M.J., Zauel R., Rao S., Yeni Y.N. (2019). Digital Tomosynthesis Based Digital Volume Correlation: A Clinically Viable Noninvasive Method for Direct Measurement of Intra-Vertebral Displacements Using Images of the Human Spine Under Physiological Load. *Medical Physics*, 46(10): 4553-4562.
- **Oravec D.**, Yaldo O., Flynn M.J., van Holsbeeck M., Yeni Y.N. (2018). Digital Tomosynthesis and Fractal Analysis Predict Prevalent Vertebral Fractures: A Preliminary In Vivo Study. *American Journal of Roentgenology*, 213(1): W38-44.
- Yeni Y.N., Kim W., **Oravec D.**, Nixon M., Divine G.W., Flynn M.J. (2018). Assessment of vertebral wedge strength using cancellous textural properties derived from digital tomosynthesis and density properties from dual energy X-ray absorptiometry and high resolution computed tomography. *Journal of Biomechanics*, 79:191-197.
- **Oravec D.**, Kim W., Flynn M.J., Yeni Y.N. (2018) The relationship of whole human vertebral body creep to geometric, microstructural, and material properties. *Journal of Biomechanics*, 73:92-98.
- Buraimoh M.A., Okoroha K.R., **Oravec D.**, Peltz C.D., Yeni Y.N., Muh S.J. (2018). A biomechanical comparison of the subscapularis peel and lesser tuberosity osteotomy in human cadaveric models. *Journal of Shoulder and Elbow Surgery Open Access*, 2(1):8-12.
- Yeni Y.N., Baumer T., **Oravec D.**, Basheer A., McDonald C.P., Bey M.J., Bartol S., Chang V. (2018). Dynamic foraminal dimensions during neck extension and rotation in fusion and artificial disc replacement: An observational study. *The Spine Journal*, 18(4):575-583.
- Chang V., Basheer A., Baumer T., **Oravec D.**, McDonald C.P., Bey M.J., Bartol S., Yeni Y.N. (2017). Dynamic measurements of cervical neural foramina during neck movements in asymptomatic young volunteers. *Surgical and Radiologic Anatomy*, 39(10):1069-1078.
- Nelson F., Bokhari O., **Oravec D.**, Kim W., Flynn M.J., Lumley C., McPhilarmy A., Yeni Y.N. (2017). The use of tomosynthesis in the global study of subchondral insufficiency fractures. *Academic Radiology*, 24(2):175-183.f
- Kim W., **Oravec D.**, Divine G.W., Flynn M.J., Yeni Y.N. (2017). Effect of View, Scan Orientation and Analysis Volume on Digital Tomosynthesis (DTS) Based Textural Analysis of Bone. *Annals of Biomedical Engineering*, 45(5):1236-1246.
- Li B., Singer N.G., Yeni Y.N., Haggins D.G., Barnboym E., **Oravec D.**, Lewis S., Akkus O. A (2016). Point-of-Care Raman Spectroscopy-Based Device for the

Diagnosis of Gout and Pseudogout: Comparison With the Clinical Standard Microscopy. *Arthritis & Rheumatology*, 68(7):1751-1757.

- **Oravec D.**, Quazi A., Xiao A., Yang E., Zuel R., Flynn M.J., Yeni Y.N. (2015). Digital Tomosynthesis and High Resolution Computed Tomography as Clinical Tools for Vertebral Endplate Topography Measurements: Comparison with Microcomputed Tomography. *Bone*, 81:300-305.
- Frisch N.B., Charters M.A., Sikora-Klak J., Banglmeier R.F., **Oravec D.J.**, Silverton C.D. (2015). Intraoperative Periprosthetic Femur Fracture: A Biomechanical Analysis of Cerclage Fixation. *Journal of Arthroplasty*, 30(8): 1449-1457.
- Kim W., **Oravec D.**, Nekkanty S., Yerramshetty J., Sander E.A., Divine G.W., Flynn M.J., Yeni Y.N. (2015). Digital Tomosynthesis (DTS) for quantitative assessment of trabecular microstructure in human vertebral bone. *Medical Engineering and Physics*, 37(1): 109-120.
- Yeni Y., Wu B., Huang L., & **Oravec D.** (2013). Mechanical loading causes detectable changes in morphometric measures of trabecular structure in human cancellous bone. *Journal of Biomechanical Engineering* 135(5): 054505.

#### **Reviewed Conference Papers / Abstracts (39)**

- **Oravec, D.**, Zuel, R., Flynn, M.J., Yeni, Y.N., (2021). Strains Measured From Digital Tomosynthesis Based Digital Volume Correlation Correlate With Those From Microcomputed Tomography In Human Vertebrae. Proceedings, 27<sup>th</sup> Annual Meeting of the Orthopaedic Research Society, Paper 0091, Long Beach, CA. (Podium presentation)
- Yeni, Y.N., **Oravec, D.**, Drost, J., Bevins, N., Morrison, C., Flynn, M.J. (2021). Bone Health Assessment via Digital Wrist Tomosynthesis in the Mammography Setting. Proceedings, 27<sup>th</sup> Annual Meeting of the Orthopaedic Research Society, Paper 0141, Long Beach, CA. (Podium presentation)
- Drost, J.P., **Oravec, D.**, Zuel, R., Flynn, M.J., Yeni, Y.N. (2021). Digital Tomosynthesis Derived Texture and Mechanical Measures Differentiate Fractured and Intact Vertebrae. Proceedings, 27<sup>th</sup> Annual Meeting of the Orthopaedic Research Society, Paper 1094, Long Beach, CA.
- **Oravec, D.**, Zuel, R., Flynn, M.J., Yeni, Y.N. (2020). Strains Measured Using Tomosynthesis-Based Digital Volumes Correlation Are Detectable Under Load and Reflect Age-Related Changes in Human Vertebral Bone. Proceedings, 66<sup>th</sup> Annual Meeting of the Orthopaedic Research Society, Paper 0286, Phoenix, AZ. (Podium presentation)
- **Oravec, D.**, Chang, V., Yeni, Y.N. (2020). Digital Tomosynthesis for Assessment of Bony Ingrowth In Porous Titanium Implants: A Proof Of Concept Study. Proceedings, 66<sup>th</sup> Annual Meeting of the Orthopaedic Research Society, Poster 0924, Phoenix, AZ.
- **Oravec, D.**, Zuel, R., Chang, V., Yeni, Y.N. (2020). Finite Element Analysis Of Human Vertebrae In Vivo Using Subject-specific Boundary Conditions.

Proceedings, 66th Annual Meeting of the Orthopaedic Research Society, Poster 1802, Phoenix, AZ.

- Drost, J.P., **Oravec, D.**, Soni, P., Zuel, R., Flynn, M., Yeni, Y. (2020). Tomosynthesis-based Digital Volume Correlation Properties Predict Vertebral Strength Independently From Bone Mineral Density. Proceedings, 66th Annual Meeting of the Orthopaedic Research Society, Late-breaking Poster 2497, Phoenix, AZ.
- **Oravec, D.**, Zuel, R., Flynn, M.J., Yeni, Y.N. (2019). Vertebral stiffness measured via tomosynthesis-based digital volume correlation is strongly correlated with reference values from micro-CT-based DVC. Proceedings, 65th Annual Meeting of the Orthopaedic Research Society, Poster 0801, Austin, TX.
- **Oravec, D.**, Soni, P., Zuel, R., Flynn, M.J., Yeni, Y.N. (2019). Clinical Measurement of Vertebral Stiffness and Displacements Using Tomosynthesis Based Digital Volume Correlation. Proceedings, 65th Annual Meeting of the Orthopaedic Research Society, Late-Breaking Poster 2252, Austin, TX.
- Yeni, Y.N., Azad, S., Baumer, T., **Oravec, D.**, Basheer, A., Bey, M.J., Barton, S.W., Chang, V. (2019). Dynamic foraminal dimensions during neck motion 6.5 years after fusion and artificial disc replacement. Proceedings, 65th Annual Meeting of the Orthopaedic Research Society, Poster 1668, Austin, TX.
- Yeni, Y., Kim, W., **Oravec, D.**, Banglmaier, W., Zhang, L., Gibson, G. (2018). Effect of ALT Crosslink Breaker on Normal and Glycated Human Femoral Cortical Bone Fracture Mechanics, Proceedings. 64th Annual Meeting of the Orthopaedic Research Society, Poster 0677, New Orleans, LA.
- Yeni, Y., Baumer, T., **Oravec, D.**, Basheer, A., Bey, M., Bartol, S., Chang, V. (2018). Does Neural Foraminal Motion Predict Long-term Patient Reported and Radiographic Outcomes After Single-Level Surgical Treatment of Cervical Radiculopathy? Proceedings, 64th Annual Meeting of the Orthopaedic Research Society, Poster 0795, New Orleans, LA.
- **Oravec, D.**, Dong, X.N., Yeni, Y. (2018). Prediction of Vertebral Uniform Compression and Wedge Strength Using DXA-Derived Stochastic Predictors, Proceedings. 64th Annual Meeting of the Orthopaedic Research Society, Poster 0797, New Orleans, LA.
- **Oravec, D.**, Zuel, R., Rao, S., Flynn, M.J., Yeni, Y.N. (2018). Vertebral Displacement Measurement Using Tomosynthesis Based Digital Volume Correlation In Vitro And In Vivo. Proceedings, 64th Annual Meeting of the Orthopaedic Research Society, Poster 2271, New Orleans, LA.
- **Oravec, D.**, Kim, W., Flynn, M.J., Yeni, Y.N. (2017). Whole Human Vertebral Body Creep is Associated with DTS-Derived Texture Parameters. Proceedings, 63rd Annual Meeting of the Orthopaedic Research Society, Poster 1284, San Diego, CA.
- Yeni, Y.N., Dix, M.R., Xiao, A., **Oravec, D.**, Flynn, M.J. (2017). Vertebral Endplate and Shell Thickness Measurement Using Digital Tomosynthesis.

Proceedings, 63rd Annual Meeting of the Orthopaedic Research Society, Poster 1287, San Diego, CA.

- Yeni, Y.N., Lindquist, M., **Oravec, D.**, Baumer, T., Bey, M.J., Bartol, S., Chang, V. (2017). Cervical Nerve Root to Foraminal Size Ratio Correlates with Post-Surgical Patient-Reported Outcomes. Proceedings, 63rd Annual Meeting of the Orthopaedic Research Society, Poster 1288, San Diego, CA.
- **Oravec, D.**, Flynn, M.J., Yeni, Y.N. (2017). The Relationship of Whole Human Vertebral Body Creep to Geometric, Microstructural and Material Properties. Proceedings, 63rd Annual Meeting of the Orthopaedic Research Society, Poster 1849, San Diego, CA.
- Chang, V., Bartol, S., Basheer, A., Baumer, T., **Oravec, D.**, Bey, M.J., McDonald, C., Yeni, Y. Dynamic Foraminal Dimensions During Neck Extension and Rotation in Fusion and Artificial Disc Replacement. Proceedings, 31st Annual Meeting of the North American Spine Society, Paper 100, Boston, MA. (Podium presentation)
- **Oravec, D.**, Zauel, R., Flynn, M., Yeni, Y.N. (2016), A Clinically Viable Noninvasive Method for Direct Measurement of Mechanical Strains in Vertebral Bone. Proceedings, 62nd Annual Meeting of the Orthopaedic Research Society, Poster 2184, Orlando, FL.
- Yeni, Y.N., Baumer, T., **Oravec, D.**, Basheer, A., Bey, M., Chang, V., Bartol, S.W. (2016), In Vivo Dynamic Changes in the Foraminal Dimensions During Neck Extension and Rotation, Proceedings, 62nd Annual Meeting of the Orthopaedic Research Society, Poster 1762, Orlando, FL.
- **Oravec, D.**, Yaldo, O., Flynn, M.J., Yeni, Y.N. (2016). Digital Tomosynthesis and Fractal Analysis Predict Prevalent Vertebral Fractures: A Preliminary In Vivo Study, Proceedings, 62nd Annual Meeting of the Orthopaedic Research Society, Poster 0779, Orlando, FL.
- Yeni, Y.N., Baumer, T., **Oravec, D.**, Basheer, A., Bey, M., Bartol, S.W., Chang, V. (2016). Dynamic Foraminal Dimensions During Neck Extension and Rotation in Fusion and Artificial Disc Replacement, Proceedings, 62nd Annual Meeting of the Orthopaedic Research Society, Poster 0262, Orlando, FL.
- Lynch J., Okoroha, K.R., Buraimoh, M.A., **Oravec, D.J.**, Peltz, C.D., Yeni, Y.N., Muh, S.J. (2017). A biomechanical comparison of the subscapularis peel and lesser tuberosity osteotomy techniques in human cadaveric models. Proceedings, 35th Annual Meeting of the Mid-America Orthopaedic Association, Paper 209, Plymouth, MI.
- **Oravec, D.**, Quazi, A., Xiao, A., Yang, E., Flynn, M.J., Yeni, Y.N. (2015). Digital tomosynthesis and high resolution computed tomography as clinical tools for vertebral endplate topography measurements: comparison with microcomputed tomography. Proceedings, 61st Annual Meeting of the Orthopaedic Research Society, Paper 0116, Las Vegas, NV. (Podium presentation)
- Yeni, Y.N., Bokhari, O., **Oravec, D.**, Kim, W., Flynn, M.J., Lumley, C., Nelson, F. (2015). Quantitative analysis of bone texture using digital tomosynthesis in

spontaneous osteonecrosis of the knee (SONK). Proceedings, 61st Annual Meeting of the Orthopaedic Research Society, Poster 1099, Las Vegas, NV.

- Kim, W., **Oravec, D.**, Xiao, A., Yang, E., Divine, G., Flynn, M.J., Yeni, Y.N. (2015). DTS derived fractal, LFD and MIL parameters contribute to prediction of whole vertebral strength and energy to fracture independent from bone mass. Proceedings, 61st Annual Meeting of the Orthopaedic Research Society, Paper 1466, Las Vegas, NV. (Podium presentation)
- Kim, W., **Oravec, D.**, Nixon, M., Divine, G., Flynn, M.J., Yeni, Y.N. (2015). Prediction of vertebral wedge strength using density, morphometric and microstructural properties derived from DXA, HRCT and DTS. Proceedings, 61st Annual Meeting of the Orthopaedic Research Society, Poster 0242, Las Vegas, NV.
- Li, B., Yeni, Y., Barnboym, E., Lewis, S., **Oravec, D.**, Haggins, D., Akkus, O. (2014). Raman spectroscopy: point of service diagnosis is sensitive and specific—a tool for improving accuracy and reducing future hospital admission. Proceedings, 2014 Meeting of the American College of Rheumatology, Paper number L11, Boston, MA.
- Kim, W., **Oravec, D.**, Maatman, T., Divine, G.W., Flynn, M.J., Yeni, Y.N. (2014). Digital tomosynthesis for prediction of human vertebral stiffness. Proceedings, 60th Annual Meeting of the Orthopaedic Research Society, Poster 1522, New Orleans, LA.
- Kim, W., **Oravec, D.**, Divine, G.W., Flynn, M.J., Yeni, Y.N. (2014). Digital tomosynthesis of human vertebral bone: the effect of positioning and scan orientation on prediction of cancellous bone stiffness. Proceedings, 60th Annual Meeting of the Orthopaedic Research Society, Poster 0710, New Orleans, LA.
- Yeni Y., **Oravec D.**, Nekkanty S., & Les C. (2013). Ovariectomy causes anatomic orientation-dependent changes in the heterogeneity of cancellous bone in rat vertebrae. Proceedings, 59th Annual Meeting of the Orthopaedic Research Society, Poster 1472, San Antonio, TX.
- Kim W., **Oravec D.**, Sander E., Divine G., Flynn, M, Yeni Y. (2013). Digital tomosynthesis-derived microstructural parameters predict cancellous bone stiffness in human vertebrae. Proceedings, 59th Annual Meeting of the Orthopaedic Research Society, Poster 0701, San Antonio, TX.
- Yeni Y., Wu B., Huang L., & **Oravec D.** (2012). Mechanical loading causes detectable changes in microstructural heterogeneity of cancellous bone. Proceedings, 58th Annual Meeting of the Orthopaedic Research Society, Poster 1375, San Francisco, CA.
- **Oravec D.**, Zauel R., & Yeni Y. (2012). The role of endplates in strain distributions and microstructural organization within the vertebral shell and cancellous centrum of a rat T5 vertebra during loading. Proceedings, 58th Annual Meeting of the Orthopaedic Research Society, Poster 1142, San Francisco, CA.
- **Oravec, D.**, Zauel, R., & Yeni, Y. (2011). The effect of endplates on cancellous bone strain distribution in uniaxially compressed rat T5 vertebrae as assessed by

digital volume correlation. Proceedings, 57th Annual Meeting of the Orthopaedic Research Society, Poster 0668, Long Beach, CA.

- Yeni, Y. & **Oravec, D.** (2012). Is microstructural heterogeneity accounted for by plate/rod-likeness of trabeculae in vertebral cancellous bone? Proceedings, 58th Annual Meeting of the Orthopaedic Research Society, Poster 1141, San Francisco, CA.
- Xia, Y., **Oravec D.**, Mittelstaedt, D., Badar, F., Yeni, Y., & Matyas, J. (2011). Depth-dependent ion concentrations in health and lesioned articular cartilage by  $\mu$ CT and  $\mu$ MRI. Proceedings, 57th Annual Meeting of the Orthopaedic Research Society, Poster 1609, Long Beach, CA.
- Les, C.M., Pechey, C.L., **Oravec, D.J.**, MacLeay, J.M., & Turner, A.S. (2007). Interaction between seasonal effects and ovariectomy on load rate response of bone structure. Proceedings, 53rd Annual Meeting of the Orthopaedic Research Society, Poster 1394, San Diego, CA.

### Media

- “DBT shows potential to assess bone health in women”. AuntMinnie.com. (Radiology News site, December 18, 2020) Therese Pablos, AuntMinnie staff writer.
- “DBT Bone Screening”. The Imaging Wire (Radiology News site, December 21, 2020)
- “Measuring Vertebral Stiffness and Displacements Using Tomosynthesis: A Weighty Solution for Thin Bones”. Orthopaedic Research Society Basic Science Tip of the Week, ORS Connect.

### Technical Proficiency & Skills

- **Mechanical testing** (monotonic, fatigue, viscoelastic, dynamic mechanical analysis. Deep experience with Instron, MTS, Bose, Biosytech & Lloyd systems. Skilled in use of strain gages, LVDT, extensometers)
- **Computational biomechanics / finite element modeling** (Comsol Multiphysics, NDUPCGM, digital volume correlation and digital image correlation methods)
- **Medical Physics and Imaging Techniques** (microcomputed tomography, dual x-ray absorptiometry, whole body digital tomosynthesis, computed tomography, magnetic resonance imaging, microcomputed tomography, digital breast tomosynthesis, microradiography, biplane fluoroscopy)
- **Biomedical image processing** (ImageJ/FIJI with deep experience in its scripting language, Dragonfly, MIPAV, ITK-SNAP, Skyscan CT-analyzer, GE Microview, 3D Slicer, Paraview, Meshlab, image registration methods)
- **Motion analysis** (Biplane fluoroscopy and markerless tracking technique)
- **Computer mathematics** (Mathematica, Maple, Mathcad)
- **Statistical analysis** (SAS JMP Statistics, Sigmastat, Sigmaplot)



- **Stereological methods** (direct and indirect methods in commercial (Skyscan CT-analyzer, BoneJ, etc.) and custom (Goulet) codes)
- **Data acquisition systems** (National Instruments DAQ systems, Vishay signal conditioning amplifiers, BIOPAC DAQ, McADDAM II Interface)
- **Machining** (Experienced in fabrication of imaging fixtures, custom tools and test systems using engine lathe, Bridgeport mill, bandsaw, drill press, grinding, CNC mill, torch soldering, lost wax and sand casting)
- **DICOM / PACS systems** (Phillips Intellispace PACS Enterprise, ClearCanvas, CharruaPACS)
- **Computer programming languages** (MATLAB, ImageJ scripting language, LabVIEW, Labtech Notebook)
- **CAD modeling** (I-DEAS, Rhinoceros NURBS Modeling, Blender)
- **Image editing** (Adobe Photoshop, Gimp)
- **Office software** (MS Office software, Linux, Lotus Notes, Endnote)
- **EHR systems (EPIC, Careplus)**
- **Video editing** (Adobe Premiere)
- **Website design** (Wordpress)
- Scientific writing
- Patient recruitment
- PC hardware, networking
- Trained in shipping and disposal of hazardous biological materials

## Teaching & Mentorship

### **Orthopaedic Residents**

- Elizabeth A. Klag, MD, Henry Ford Hospital, 2020-present.
- Nicholas B. Frisch, MD, Henry Ford Hospital: Cerclage Fixation for Cementless Total Hip Arthroplasty Complicated by Intraoperative Vancouver B1 Periprosthetic Fractures: A Biomechanical Analysis, 2013 –2014
- M. Ayodele Buraimoh, MD, Henry Ford Hospital: Biomechanical comparison of postoperative loading in subscapularis repair techniques, 2014-2015.

### **Medical & Graduate-Level Students**

- Ryan Bylsma, Wayne State University, School of Medicine, October 2011 – January 2012.
- Mary Nixon, Wayne State University, School of Medicine, May 2012 – July 2012.
- Justin Schupbach, Wayne State University, School of Medicine, June 2012 – July 2012.
- Kaitlin McLoughlin, Wayne State University, School of Medicine, August 2012 – September 2012.
- Kalyan Sreeram, Wayne State University, School of Medicine, August 2012 – April 2013.
- Thomas K. Maatman, Wayne State University, School of Medicine, August 2012 – May 2013.

- Toufic Jildeh, Wayne State University, School of Medicine, Year 1, May – September 2013. *Medical Student Summer Research Fellowship Award*, Wayne State University, 2013. “Comparative Quantitative Assessment of Bone Microstructure”.
- Matthew Varga, Wayne State University, Biomedical Engineering MS Program, June 2013 – December 2013.
- Omaima Bokhari, Wayne State University, School of Medicine, Year 4, August 2013 – May 2014.
- Ali Sobh, Wayne State University, School of Medicine, Year 3, December 2013 – January 2014.
- Matthew Madion, Wayne State University, School of Medicine, Class of 2017, April 2013 – present. *Medical Student Summer Research Fellowship Award*, Wayne State University, 2014. “Can Trabecular Texture Analysis Predict Vertebral Fracture”.
- Lamees Yahya, Wayne State University, Biomedical Engineering, January – December, 2015. “Cortical bone changes in diabetic obese mice treated with a crosslink breaker”
- Sasha Stein, Wayne State University, School of Medicine, Year 1, February - November 2015. “Nonlinear ultrasound for detecting cortical microfractures”
- Nicholas Adams, Wayne State University, School of Medicine, Class of 2018, May – August 2015. *Medical Student Summer Research Fellowship Award*, Wayne State University, 2015. “Tomosynthesis scans for mapping vertical and horizontal trabeculae”
- Hunter Trafton, Wayne State University, School of Medicine, Year 1, January – September, 2016. “Cervical spinal canal geometry during neck motion”
- Sherwin Azad, Wayne State University, School of Medicine, Year 1, March 2016 – September 2016. “Three dimensional In-Vivo Motion Analysis of the Cervical Spine 5 Years Following Anterior Cervical Decompression and Fusion”
- Mirabelle Lindquist, Wayne State University, School of Medicine, Year 1, March – July, 2016. *Medical Student Summer Research Fellowship Award*, Wayne State University, 2015. “Nerve Root to Foraminal Wall Distances During Neck Motion”.
- Michael Dix, Wayne State University, School of Medicine, Year 1, March – July 2016. *Medical Student Summer Research Fellowship Award*, Wayne State University, 2015. “Measurement of Vertebral Geometry from Digital Tomosynthesis Images”.
- Parnell White, Wayne State University, School of Medicine, Year 1, April – July 2016. “Three dimensional In-Vivo Motion Analysis of the Cervical Spine 5 Years Following Arthroplasty with an Artificial Disc”.
- Ian Monk, Wayne State University, School of Medicine, Year 1, May 2016 – July 2016. “Quantitative morphometric assessment of vertebral fracture from low-dose CT scout views in NLST”.

#### **Undergraduate and high school students**

- Anuhya Bhogineni, Athens High School, Troy, MI, June 21 – August 13, 2010.
- Fariha Ghazi, Athens High School, Troy, MI, June 21 – August 13, 2010.
- Subhum Sidhar, West Bloomfield High School, MI, June 21 – August 13, 2011.
- Brenda Wu, Troy High School, Troy, MI, June 21 – August 13, 2011.
- Vincent Giacomelli, Harrison High School, Farmington, MI, June 18 – August 10, 2012.
- Joy Zhang, Detroit Country Day High School, Beverly Hills, MI, June 10 – August 9, 2013.
- Angela Xiao, Troy High School, Troy, MI, June 17 – September 30, 2013.
- Ellen Yang, Troy High School, Troy, MI, July 17 – September 30, 2013.
- Abrar Quazi, International Academy (IB Program), Bloomfield, MI, June 23 – August 1, 2014.  
“Digital Tomosynthesis and High Resolution Computed Tomography as Clinical Tools for Vertebral Endplate Topography Measurements: Comparison with Microcomputed Tomography”
- Bhavini Patel, Athens High School, Troy, MI, July 25 – September 1, 2016.  
“Neck muscle condition after fusion and arthroplasty surgeries”
- Andrew Schildcrout, Berkley High School, May - August, 2017  
“Cervical spine motion tracking”
- Imran Quazi, International Academy Bloomfield Campus High School, June 19 – August 11, 2017  
“3D fractal based BMD texture to predict vertebral fracture”
- Fatinah Albeez, International Academy East of Troy, September 9, 2017 –  
“BMD measurements in smokers (NLST)”
- Surya Krishnan, International Academy East, June 22, 2018 – August 1, 2018.  
“DTS-based DVC image processing”
- Pratham Soni, Troy High School, June 18, 2018 – August 24, 2018  
“DTS-based DVC analysis”
- Razeen Zaman, Detroit Country Day High School, Beverly Hills, MI, June 2019-February 2020  
“Segmentation of vertebral facet joint from digital tomosynthesis images”

### **Community Involvement**

- Grosse Pointe Symphony Orchestra, Associate Concertmaster, 2010-present
- Livonia Symphony Orchestra, Section Violin, 2011-present
- Southern Great Lakes Symphony Orchestra, Substitute Violin, 2011-2013
- Tampere Chamber Music Society, Concertmaster, 2007-2009
- Southfield Philharmonic, Section Violin, 2003-2005
- Visiting Nurses Associate Hospice, Unpaid volunteer, 2002-2003
- Detroit Symphony Civic Orchestra, Section Violin, 1997-2003

### **Languages**

- **English**, Native Language
- **Finnish**, Conversational competence
- **French**, Speak, read and write with basic competence