

Michael D. Ludwig, PhD, MS, BS

Associate Professor of Anatomy

Franciscan Missionaries of Our Lady University,
5414 Brittany Drive
Baton Rouge, Louisiana 70808

Curriculum Vitae

Education

Ph.D.	May 2018 (Defense: Sept. 2017) Pennsylvania State University College of Medicine; Anatomy
MS	May 2015 Pennsylvania State University College of Medicine; Anatomy
BS	May 2013 Lycoming College; Biology (Anatomy and Physiology Track)

Teaching Experience

2018-Present, Franciscan Missionaries of Our Lady University

- Professor & Course Coordinator: DPTH 7411 Structural and Functional Anatomy I
 - Duties: Organization and scheduling of the course content, creation of lecture materials for anatomy component, creation of exams and lab practicals, lecturing on anatomy content.
- Professor & Course Coordinator: DPTH 7315 Neuroanatomy
 - Duties: Organization and scheduling of the course content, coordination and facilitation of guest lectures creation of lecture materials for neuroanatomy component, creation of exams, lecturing on neuroanatomy content.
- Professor & Course Coordinator: DPTH 7412 Structural and Functional Anatomy II
 - Duties: Organization and scheduling of the course content, creation of lecture materials for anatomy component, creation of exams and lab practicals, lecturing on anatomy content.
- Professor & Course Coordinator: PHAS 5740 Medical Anatomy and Neuroanatomy, and PHAS 5740L Medical Anatomy Laboratory
 - Duties: Organization and scheduling of the course content, creation of lecture materials, creation of exams and lab practicals, lecturing on anatomy content, facilitating lab activities
- Scholarly Project Chair: DPTH 7741,7742,7743 (2020-Present)
 - Duties: Mentorship of student research
- Content Developer & Course Coordinator: Anatomy and Physiology for the Health Professions review modules (2020-present)
 - Duties: creation of course content, facilitation of the modules, identification of students in need of anatomy and physiology assistance using the HAPS exam
- Course Coordinator DPTH 7217: Pharmacology and Radiology (Summer 2024)
 - Duties: Facilitation and scheduling of the course material, creation of the exams
- Course Coordinator: DPTH 7218 Pathology for Differential Diagnosis (Spring 2024)
 - Duties: Facilitation and scheduling of the course material, creation of exams
- Thesis Advisor PHAS 5910 Master's Project (2018-2019)
 - Duties: Mentorship of student research

Other roles

- Examsoft Superuser for Doctor of Physical Therapy Program and Physician Assistant program
 - Duties: onboarding new faculty and students to Examsoft and Examplify, administration of Examsoft rights and accounts to faculty and visiting graders, organization and creation of the DPT Comprehensive Written Exams

2015-2017, Various Institutions

- Teaching Assistant and Lecturer, Human Gross Anatomy for Medical and Physician Assistant Students, Penn State Hershey College of Medicine
- Teaching Assistant, Neuroanatomy for Medical Students, Penn State Hershey College of Medicine
- Lecturer, Neurosurgery Resident Lecture Series, Penn State Hershey College of Medicine
- Guest Lecturer, General Biology, Harrisburg Area Community College
- Teaching Assistant and Lecturer, Human Gross Anatomy for Medical and Physician Assistant Students, Penn State Hershey College of Medicine
- Lecturer, Neurosurgery Resident Lecture Series, Penn State Hershey College of Medicine

Professional Societies

- American Association of Anatomists – Member
- Physician Assistant Education Association - Member
- Consortium of Multiple Sclerosis Centers – Student

Honors and Awards

- Acceptance into the Anatomical Education Research Institute, February 2020 (attended July 2022)
- Featured Article in Experimental Biology and Medicine, February 2018
- Featured Article in Experimental Biology and Medicine, August 2017
- Penn State Graduate Student Research Forum Travel Award, March 2017

Publications

Ludwig M., Zagon, I.S., McLaughlin, P.J. (2018) Feature Article: Modulation of the OGF-OGFr pathway alters cytokine profiles in experimental autoimmune encephalomyelitis and multiple sclerosis. *Experimental Biology and Medicine*: 243, 361-369. doi:10.1177/1535370217749830.

Ludwig M., Zagon I.S., McLaughlin P.J. (2017) Elevated serum [Met⁵]-enkephalin levels correlate with improved clinical and behavioral outcomes in experimental autoimmune encephalomyelitis. *Brain Research Bulletin*: 134, 1-9. dx.doi.org/10.1016/j.brainresbull.2017.06.015.

Ludwig M., Zagon I.S., McLaughlin P.J. (2017) Feature Article: Serum [Met5]-enkephalin levels are reduced in multiple sclerosis and restored by low dose naltrexone. *Experimental Biology and Medicine*. 242(15) 1524-1533. doi: 10.1177/1535370217724791

Ludwig M., Turel A.P., Zagon I.S., McLaughlin P.J. (2016). Long-term treatment with low dose naltrexone (LDN) maintains stable condition in multiple sclerosis. *Multiple Sclerosis Journal: Experimental, Translational and Clinical*. doi: 10.1177/2055217316672242

Ludwig M., Turel AP, Zagon IS, McLaughlin PJ (2015). Treatment of clinically isolated syndrome with low dose naltrexone. *Clin Case Rep Rev* 1: doi: 10.15761/CCRR.1000161

Abstracts and Presentations

1. **Ludwig M.**, Chappell R. Anatomy Update: Cutting technology in the field that never changes. Platform presented at: PAEA South Regional Education Meeting; June 8, 2025; Decatur Georgia
2. **Ludwig M.**, Chappell R. Effective use of Artificial Intelligence in the Classroom: Examples for Students and Educators. Poster presented at: Franciscan Missionaries of Our Lady University Research and Scholarship Showcase; April 30, 2025; Baton Rouge, LA
3. **Ludwig M.**, Page P. Improving Knowledge and Confidence in Musculoskeletal Ultrasound in DPT Students .Poster presented at: Franciscan Missionaries of Our Lady University Research and Scholarship Showcase; April 30, 2025; Baton Rouge, LA
4. Caillet J, **Ludwig M.**, Page P, Thompson J, Swafford A. Incorporating Musculoskeletal Ultrasound into Graduate Physical Therapy education: A Retrospective Analysis. Poster presented at: APTA Combined Sections; February 16, 2024; Boston, MA.

5. **Ludwig M**, Paul L. Animal Research at Franciscan Missionaries of Our Lady University and the Role of the Institutional Animal Care and Use Committee. Presented at: Franciscan Missionaries of Our Lady University Research and Scholarship Showcase; April 20, 2023; Baton Rouge, LA.
6. **Ludwig M**, Caillet J, Swafford A, Thompson J, Page P. The D-MaSKUS Project: Incorporating Diagnostic Ultrasound into Graduate Physical Therapy Education: A Proposal and Pilot Data. Presented at: Franciscan Missionaries of Our Lady University Research and Scholarship Showcase; April 20, 2023; Baton Rouge, LA.
7. Woods J, Rusciano V, Thompson J, **Ludwig M**. Does Percussion Massage Affect Peripheral Blood Flow? Platform presented at: APTA-Louisiana Spring Meeting; March 17, 2023; Lafayette LA.
8. Tate R, Hennigan C, Caillet J, **Ludwig M**. Influence of Transverse Abdominis Activation on Muscle Activation Amplitude of the Posterior Oblique Chain. Platform presented at: APTA-Louisiana Spring Meeting; March 17, 2023; Lafayette, LA. .
9. **Ludwig M**, Page P. Augmenting anatomy with virtual reality. Poster presented at: Franciscan Missionaries of Our Lady University Research and Scholarship Showcase; April 21, 2022, Baton Rouge, LA
10. Henderson A, Alphonso E, Caillet J, **Ludwig M**, Page P. Does forward shoulder posture influence muscle activation amplitude and strength during external rotation and shoulder elevation exercises? Platform presented at: APTA-Louisiana Spring Meeting; March 18, 2022; Lafayette LA .
11. Werner S, Fennell C, Nelson T, **Ludwig M**. Barriers to physical therapy accessibility for patients with non-physical disabilities. Poster presented at: APTA-Louisiana Spring Meeting; March 18, 2022; Lafayette, LA
12. Conly J, **Ludwig M**, Page P. The Effect of Lateral Resistance Applied Using the THERABAND Vector on Hip Muscle Activation During a Squat: A Pilot EMG Analysis. Poster presented at APTA-Louisiana Spring Meeting; March 19, 2021; Virtual.
13. Thompson J, **Ludwig M**, Caillet J. Intervertebral Disc Hydration for Management of Low Back Pain: Theory, Science, and Application. Poster presented at: APTA-Louisiana Fall Meeting; October 9, 2020; Virtual
14. **Ludwig M**, Thompson J. Intervertebral discs and disc hydration: An anatomical and physiological review with implications for the clinical setting. Poster presented at APTA-Louisiana Fall Meeting; August 23, 2019; Baton Rouge, LA .
15. **Ludwig M**. Methionine-enkephalin and multiple sclerosis: treatment disease development and the potential for diagnostics. Poster presented at: Franciscan Missionaries of Our Lady University Research and Scholarship Showcase; April 2018, Baton Rouge, LA
16. **Ludwig M**, Zagon IS, McLaughlin PJ. The role of enkephalins in the pathophysiology of multiple sclerosis: what we can learn from mouse models. Pre-recorded platform presented at: Low Dose Naltrexone Conference; 2017.
17. **Ludwig MD**, Zagon IS, McLaughlin PJ. Serum enkephalin levels correlate with EAE disease severity. Poster presented at: Experimental Biology; April 2017, Chicago, IL
18. **Ludwig M**, Turel A, McLaughlin P. Low dose naltrexone is safe and effective treatment for multiple sclerosis: preclinical and retrospective studies. Poster presented at: International Multiple Sclerosis Cognition Society Meeting; June 2016, New York, NY.

Current Lines of Research and Scholarly Inquiry

- **Primary investigator**
 - Examine the efficacy of various anatomical teaching modalities in graduate anatomy education
- **Co-Investigator**
 - Incorporation of musculoskeletal ultrasound into DPT curriculum
- **Co-Investigator**

- Determining indicators of student success in the basic sciences in DPT and PTA curriculum

Endowments/Grants Awarded

2023

Endowed Professorship – Funding for the Human Anatomy and Physiology Society Exams and Assessing Their Use with the Physical Therapy Assistant Program

Amount awarded \$2,000

2022

Endowed Professorship – Augmenting Anatomy Education with Virtual Reality

Amount awarded \$37,702

2021

Endowed Professorship - Utilizing Portable Musculoskeletal Ultrasound for Physical Therapy Education

Amount awarded \$3,500

Endowed Professorship - Funding for the Human Anatomy and Physiology Society (HAPS) Exams and Modules

Amount awarded \$6,000

2020

Endowed Professorship - Pilot BodyViz in Anatomy

Amount awarded \$30,000

Committees

2018-Present

- Franciscan Missionaries of Our Lady University, Institutional Animal Care and Use Committee (IACUC)– Chair
 - Duties: Semiannual review of Animal Program, Policies and Protocols, Semiannual Animal Facilities Inspections, Administrating protocol proposal reviews, Facilitation of adverse event investigations, Facilitating monthly meetings, Creating Agendas and Minutes
- Franciscan Missionaries of Our Lady University, Institutional Review Board (IRB) – Member
 - Duties: Attend Meetings, Review Human Research Proposals
- Franciscan Missionaries of Our Lady University, Research and Scholarship Council - Standing Member (chair for AY 2019-2020, 2020-2021)
 - Current Duties: Attend as IACUC Chair, Assist with Research and Scholarship Showcase
 - Duties as Past Chari: Facilitate monthly meetings, Conduct feasibility reviews for research proposals, Facilitate the annual Research and Scholarship Showcase (Virtual for 2020 and 2021)
- Franciscan Missionaries of Our Lady University, Doctor of Physical Therapy Program Research Committee – Member
 - Duties: Oversight and facilitation of research activities for the DPT program
- Franciscan Missionaries of Our Lady University, Physician Assistant Program Admissions Committee – Member
 - Duties: Supporting the PA program during admission activities, including application review and conducting interviews
- Franciscan Missionaries of Our Lady University, Department of Physical Therapy- Faculty Search Committee – Member (2018, 2019, 2021)
 - Duties: Candidate evaluation

- Franciscan Missionaries of Our Lady University, Physician Assistant Program Faculty Search Committee Member (2023)
 - Duties: Candidate evaluation
- Franciscan Missionaries of Our Lady University, Doctor of Nurse Practitioner Program, Thesis Committee (2018, 2019)
 - Duties: Mentorship of Student Research

Number of studies reviewed in 2025: 1

- The Relationship Between Social Determinants of Health and Congestive Heart Failure

Number of studies reviewed in 2024: 6

- Health Behavior Assessment of Freshmen Students
- Evaluation of the Use of Daptomycin and Linezolid at a Large Community Hospital
- Effect of dry needling on spasticity, muscle length, and tissue stiffness in the gastroc-soleus complex in children with cerebral palsy
- Observational Pilot Study: Comparison of different levels of resistance applied during self-selected walking velocity tasks on muscle activation and spatiotemporal parameters of gait
- Exploring the Correlation Between Undergraduate GPA and Success in the First Year of a Doctor of Physical Therapy Program Utilizing a Digital Survey
- PS2023-01, The Genetic Evaluation and NCCN Education (GENE) Study

Number of studies reviewed in 2023: 6

- Superficial Reflux
- Use and Misuse of Fecal Occult Blood testing for inpatient evaluation of GI bleeding and Anemia: Missed opportunities
- Does intermittent pneumatic compression change soft tissue pain and stiffness?
- Does Electrical Trigger Point Dry Needling to the Gluteus Medius Affect Pelvic Stabilization During A Drop Down Test?
- A DOPPLER ULTRASOUND COMPARISON OF EFFECTIVENESS OF BRACHIAL ARTERY OCCLUSION BETWEEN BLOOD FLOW RESTRICTION DEVICES.
- Virtual Nurse Pilot on PCU: A Collaborative Model

Number of studies reviewed in 2022: 6

- The Influence of Emotional Intelligence Training on Pre-licensure Baccalaureate Nursing Students
- Validation of Digitsole Pro Smart Insoles for Gait Analysis
- Does Deep Oscillation Therapy (DOT) change fluid balance in Upper Extremity
- Addressing Challenging Behaviors in Pediatric Physical Therapy Patients with Intellectual Disabilities
- Evaluation of Argatroban Usage Pattern in Patients with Clinical Possibility of Heparin Induced Thrombocytopenia (HIT)
- Registry values for clinical venous laboratory tests Reflux I

Number of studies reviewed in 2021: 5

- Implementing a Pharmacology Module into the FranU Dietetic Intern Curriculum Using the Competence Based Education (CBE) Method
- Developing a Valid and Reliable Tool for Exploring Barriers to Retention, Progression, and Completion in a Community Health and Wellness Program
- Dietetic Internship Orientation: Modules to Assess Knowledge, Confidence, and Preparedness in Interns
- Does Forward Shoulder Posture Influence Muscle Activation Amplitude and Strength During External Rotation and Shoulder Elevation Exercises?

- Quantifying Movement (Kinematic and Electromyographic) Variables of the Upper Extremity using an Immersive Virtual Reality Application

Number of studies reviewed for initial review in 2020: 7

- Identifying the opinions of healthcare professionals overseeing immunocompromised patients about the neutropenic diet utilizing semi-structured interviews
- Does implementing virtual reality into treatment sessions show improvements in balance and postural control for peripheral vestibular hypofunction?
- The Effect of Lateral Resistance by the TheraBand VECTOR System on Hip Abductor Activation During Resisted Side Stepping: An EMG Analysis
- The Effects Of Ankle Braces On Ankle Muscle Activation During Single Leg Balance Exercises
- Attitudes and Beliefs of Physical Therapists and PT Administrators Regarding a Variable Work Schedule
- A Survey of Physical Therapists' Measuring Intensity for Neurologically Diagnosed Patients
- Reliability and Validity of Cervical Disc Height Using Magnetic Resonance Imaging and Musculoskeletal Ultrasound

Number of studies reviewed in 2019: 7

- Assessment of trends in the anesthetic management of surgical patients who have received outpatient ketamine infusion treatments
- Physician assistants' knowledge and attitudes concerning fertility awareness methods
- High fidelity simulation: Anaphylaxis intra-operative: A quasi-experimental study
- Transition of pediatric patients to adult sickle cell care
- Reducing the nightly nursing calls at OLOL children's hospital
- Prospective natural history of vestibular loss in USH1C
- The interest, knowledge, and perception of grand rounds as an interprofessional education (IPE) among PA, DPT, and RDN students at Franciscan Missionaries of Our Lady University

Number of studies reviewed in 2018: 2

- Evaluation of the pediatric resident wellness curriculum
- Firefighters and fitness: assessing occupational health hazards and health beliefs