

## **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**

<b>Ph.D.</b>	May 2018 (Defense: Sept. 2017) Pennsylvania State University College of Medicine; Anatomy
<b>MS</b>	May 2015 Pennsylvania State University College of Medicine; Anatomy
<b>BS</b>	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 Exemplify, 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 [Met<sup>5</sup>]-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 [Met<sup>5</sup>]-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, Adminstrating 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