Curriculum Vitae | Zachary M Deak, DO

Contact

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Education

Michigan State University College of Osteopathic Medicine 2018 - 2022
Doctor of Osteopathic Medicine
- ❖ Top Quintile Graduate
- ❖ COMLEX Level 1: 642, 90th Percentile

Central Michigan University 2014 - 2018
Bachelor of Science in Biomedical Sciences
- ❖ Honors Program Graduate
- ❖ *Summa Cum Laude,* 3.92 GPA

Research Experience

Clinical Case Study 2021
General Surgery, Detroit Medical Center Sinai-Grace Hospital
Michigan State University College of Osteopathic Medicine
- ❖ Identified and proposed an unusual presentation of lung adenocarcinoma for case report publication during a surgery rotation.
- ❖ Led patient consent, biopsy coordination, pathology imaging, literature review, and manuscript preparation.
- ❖ Coauthored the published report describing rare soft tissue metastases from primary lung adenocarcinoma.
- ❖ Managed journal selection, submission logistics, and revisions independently.

Honors Capstone 2017 - 2018
Rossignol Lab, Program in Neuroscience, Department of Psychology
Central Michigan University
- ❖ Designed and carried out a capstone project evaluating neurotrophin-3 (NT-3) overexpressing mesenchymal stem cell (MSC) grafts generated with lentiviral vectors for promoting motor recovery after complete spinal cord transection.
- ❖ Awarded the CMU Undergraduate Research & Creative Endeavors Grant.
- ❖ Performed cell culturing, tissue preparation, immunohistochemistry, RT-PCR, flow cytometry, and behavioral testing.
- ❖ Participated in stereotactic transection and stem cell transplant surgeries.
- ❖ Contributed to data analysis, figure preparation, and experimental design.

Research Assistant 2016 - 2018
Rossignol Lab, Field Neurosciences Institute Laboratory for Restorative Neurology
Central Michigan University
- ❖ Contributed to multiple projects evaluating mesenchymal and neural stem cell transplantation strategies and therapies (eg, SDF-1) for spinal cord injury.
- ❖ Collaborated with graduate students, assisting with cell culturing, post-mortem analyses, tissue preparation, immunohistochemistry, flow cytometry, and behavioral testing with Basso, Beattie, Bresnahan (BBB) locomotor rating scale.
- ❖ Assisted with manuscript development, including editing and figure preparation, resulting in two peer-reviewed publications.

Undergraduate Research Assistant 2015 - 2016

Jensen Lab, Department of Chemistry & Biochemistry, Central Michigan University

- Investigated basic enzymatic mechanisms involving nicotinamide adenine dinucleotide (NAD) and flavin adenine dinucleotide (FAD) electron carriers.
- Assisted graduate students in experiment replication, yield tracking, and product validation using nuclear magnetic resonance (NMR).
- Gained foundational lab experience in organic chemistry techniques, mass spectrometry, and infrared spectrometry.

Publications

Tvedten E, **Deak Z**, Schwartz B, Rice A. 2021. An Atypical Presentation of Soft Tissue Metastasis in a Patient With Lung Cancer. Cureus. 13(7):e16294.

Stewart AN, Kendziorski G, **Deak ZM**, et al. 2018. Transplantation of Mesenchymal Stem Cells that Overexpress NT-3 Produce Motor Improvements without Axonal Regeneration following Complete Spinal Cord Transections in Rats. *Brain Research*. 1699:19-33.

Stewart AN, Kendziorski G, **Deak ZM**, et al. 2017. Co-Transplantation of Mesenchymal and Neural Stem Cells and Overexpressing Stromal-Derived-Factor-1 for Treating Spinal Cord Injury. *Brain Research*. 1672:91-105.

Presentations

Deak ZM, Kendziorski G, Stewart AN, Dunbar GL, Rossignol J. Engineering Mesenchymal Stem Cells to Overexpress Neurotrophin-3 as a Treatment for Spinal Cord Injury. *Capitol Scholars Exhibition*, Michigan State Capitol, Lansing, MI. March 2018. Poster.

Deak ZM, Kendziorski G, Stewart AN, Dunbar GL, Rossignol J. Transplantation of Neurotrophin-3 Overexpressing Mesenchymal Stem Cells Rostral and Caudal to the Epicenter Following Spinal Cord Injury. *CMU Student Creative Research & Endeavors Exhibition*, Mount Pleasant, MI. April 2018. Poster.

Selected Technical Projects

3D Rendering Engine - Bedbug 2024 - Present

- Designed to support real-time rendering of anatomy models and medical imaging for educational and diagnostic tools.
- Custom visualization software that renders interactive three-dimensional models from raw vertex data.
- Currently developing a DICOM file parser and viewer to render medical imaging data.
- Current tech stack includes Odin, C, Vulkan, and Bash.

Online Medical Boards Prep Platform - MedStudForty 2022 - Present

- Aims to improve diagnostic reasoning in preclinical students, emulating the USMLE/COMLEX exams
- Developed a real-time testing interface for attempting clinical question blocks
- Includes a content management system and dashboard for question creation, editing, and user session tracking.
- Integrated user authentication, analytics, and SEO optimization.
- Current tech stack includes TypeScript, React/Next.js, and MySQL.

Interdisciplinary Experience

Founder & Educator 2022 - Present
MedStudForty, LLC

- Built an online, interactive USMLE/COMLEX-style question bank and tutoring platform for medical students.
- Delivered individualized tutoring based on each student's performance data and designed custom review strategies for targeted learning.
- Built a custom interface allowing students to write, edit, and review their own user-created questions.
- Authored hundreds of practice questions with explanations aligned to NBME/NBOME blueprints.

CNC Operator 2022 - Present
Custom Cabinetry Contractor

- Operated CNC router and laser engraving systems to fabricate custom cabinetry from digital designs, managing complete design-to-production workflows.
- Translated client specifications into CAD models and toolpaths, iterating on prototypes to resolve material constraints and manufacturing challenges.
- Developed skills in subtractive manufacturing processes and material properties.

Neuroanatomy Lab Bluecoat *(Teaching Assistant)* 2020
Michigan State University College of Osteopathic Medicine

- Led small-group, prosection-based neuroanatomy labs for first-year medical students.
- Served as a peer mentor by leading in-lab discussions, proctoring exams, and modeling professional lab conduct.

Human Anatomy Lab Bluecoat *(Teaching Assistant)* 2019
Michigan State University College of Osteopathic Medicine

- Facilitated prosection-based gross human anatomy labs with emphasis on structure-function relationships and clinical application.
- Proctored quizzes and practicals, enforced lab protocols, and ensured respectful handling of donors.

Student Liaison 2018 - 2022
Michigan Osteopathic Association

- Responsibilities included promoting MOA events to fellow medical students and assisting with the *MOA Annual Spring Scientific Convention*.
- Student representative on the *MOA Council of Interns and Residents*.

Health Careers Pipeline Program Mentor 2015 - 2017
Central Michigan University College of Medicine

- Mentored high school students through a 9-week, active learning curriculum, facilitating hands-on healthcare simulations and group discussions.
- Supported program operations for CampMed, a two-day immersive event, by assisting with healthcare-related workshops and suture clinics.

Skills & Training

Medical: POC Ultrasound, ACLS, BLS
Programming Languages: C, C++, Odin, Python, Typescript, OCaml
Software Development: Vulkan, OpenGL, React, Next.js, Prisma, SQL, Bash, Linux
Fabrication: Blender, AutoCAD, CAD, CNC, Laser Engraving