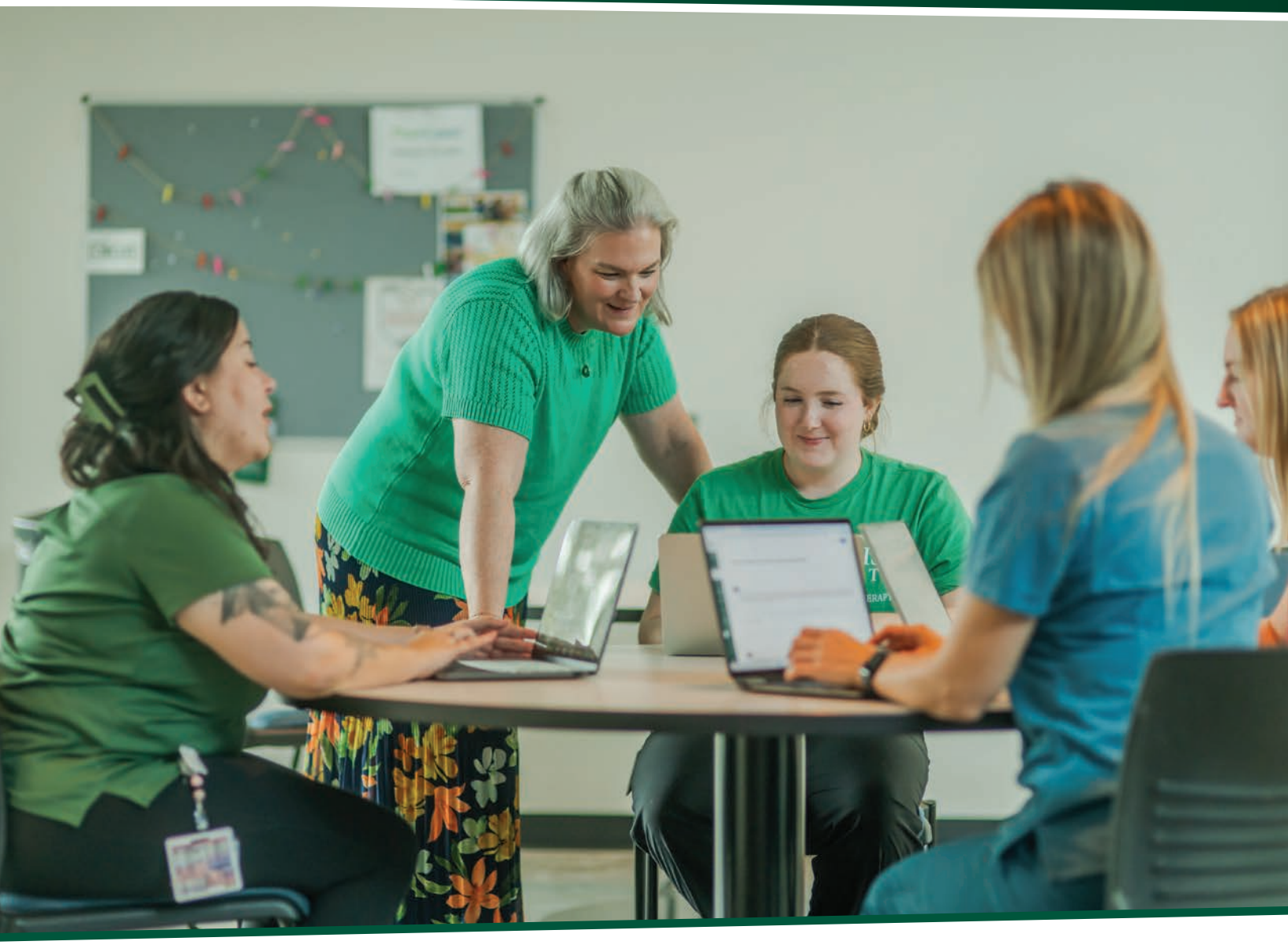
Methodist University's OTD Program Presents the

Seventh Annual Occupational Therapy Class of 2027 Student Scholarship Research Symposium



METHODIST UNIVERSITY

DOCTOR OF OCCUPATIONAL THERAPY

April 11, 2026 | 8:30 a.m.

Dr. Frank P. Stout Physician Assistant Complex
Medical Lecture Hall & Streamed Online
5400 Ramsey St., Fayetteville, NC 28311

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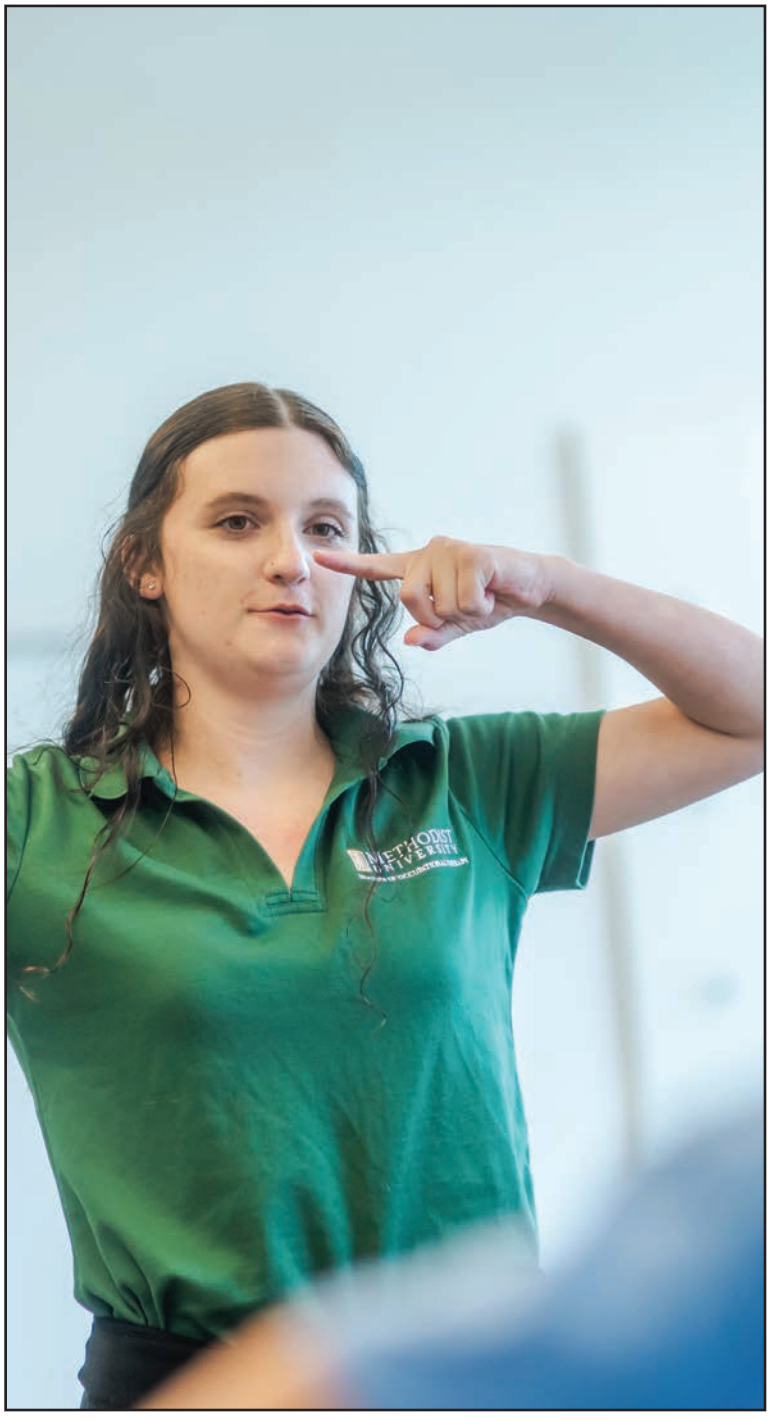
Introduction to the OTD Symposium

These student presentations represent a component of the OTD curriculum that meets the educational standards for scholarship and evidence-based practice. The Clinical and Community Capstone Scholarly Project is part one of the capstone curriculum and begins in the summer term of the first year of the program.

This project is mentored by a faculty member and is aligned with the mentor's scholarly agenda. Completion of the Capstone Scholarly Project prepares the student and serves as the impetus for the culminating Capstone Experience. It generally begins with a literature review, PICO question generation, traditional qualitative or quantitative methods of inquiry, and culminates in the final didactic semester of the program with peer-reviewed dissemination efforts.



OTD Scholarly Agenda

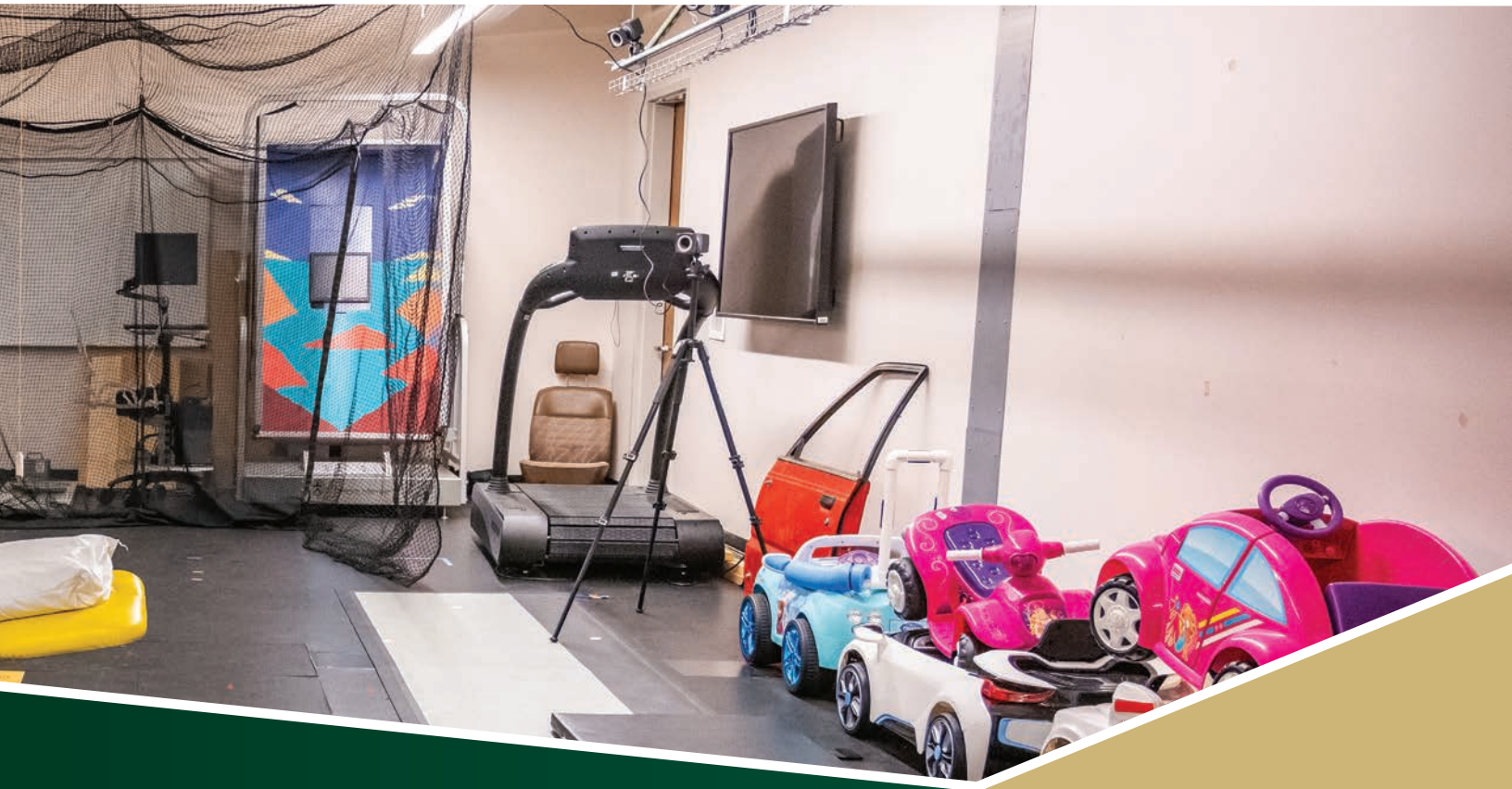
Our departmental faculty scholarship agenda seeks to build quality evidence that spans the depth and breadth of the occupational therapy profession. The OTD program faculty, in collaboration with our students, strives to advance the profession through scholarly engagement, enrichment, and empowerment. Collectively, our scholarly work will create a well-rounded, creative, and collaborative environment that uses a multidisciplinary approach to incorporate the basic and applied sciences, including rehabilitation science, health and wellness, social sciences, and engineering. Pragmatically, our research is grounded in theory, molded by the grant-writing process, and executed in clinical and community-engaged settings. Simultaneously, our faculty scholarship agenda coincides with the evidence-based practice and research course series, allowing us to build a strong peer-mentor relationship with our OTD students and foster student-led capstone scholarship. The ultimate goal of our work are to create evidence-driven occupational therapists and scientists who will contribute to advancing human health and wellness through participation in everyday life activities.

Faculty Capstone Mentors

Danielle Felak, OTD, OTR/L
Matthew Foreman, Ph.D.
Meredith Gronski, OTD, OTR/L, CLA, FAOTA
Katherine Jones, Ed.D., OTR/L, CLT-LANA, CWT
Sheri Michel, OTD, OTR/L
Alice "AJ" Mullholand, OTD, OTR/L, CHT
Charlotte Navarro, OTD, OTR/L

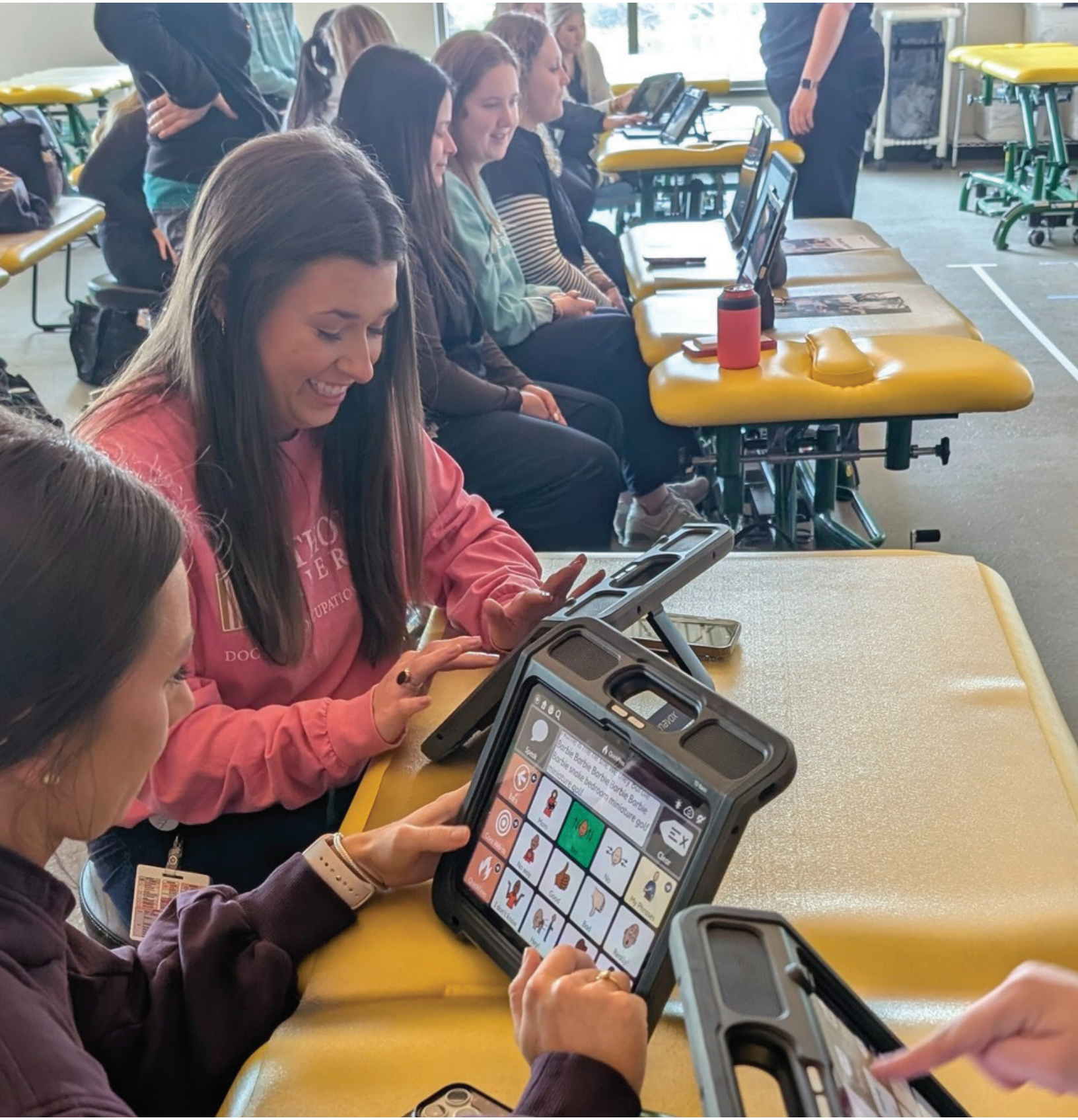
8:45-9 a.m.	**Opening Remarks**	**Katherine Jones**
9-9:15 a.m.	Beyond the Pelvis: Exploring the Experiences of Adults Living with Chronic Gynecological Conditions	Darcy Martin-Ferguson Mentor: Katherine Jones
9:15-9:30 a.m.	Postpartum Pelvic Health and Occupational Performance in Hypermobile Ehlers-Danlos Syndrome (hEDS) and Hypermobility Spectrum Disorder (HDS)	Autumn Harrington Mentor: Katherine Jones
9:30-9:45 a.m.	Bridging the Gap: Addressing and Improving Health Literacy in Native American Adults from the Lumbee Tribal Community	Maddison Oxendine Mentor: Katherine Jones
9:45-10 a.m.	Exploring Adverse Childhood Experiences' Impact on Adulthood Interoception: An Anonymous Self-Report Survey Study	Sarah Haywood Mentors: Katherine Jones, Danielle Felak
10-10:15 a.m.	An Evidence-Based Curriculum for Transitional Housing for Adults with Intellectual and Developmental Disabilities (IDD)	Molly Crouse, Grey Pittman, Molly Surles Mentor: Danielle Felak
10:15-10:45	**Q&A Break**	
10:45-11 a.m.	Occupational Therapy's Role in Supporting Hospital-to-School Transition in Pediatric Cancer Survivorship	Bayleigh Gauntt-Thompson, Kaitlyn Campbell, Alyssa Hargrove Mentors: AJ Mulholland, Sheri Michel
11-11:15 a.m.	Optimizing Occupational Performance Among Special Operations Forces' Spouses During a Deployment Cycle	Colleen Fink Mentor: Sheri Michel
11:15-11:30 a.m.	Exploring Social Participation and Occupational Engagement in Spanish-Speaking Immigrant Populations with Language Barriers to Understand the Role of Occupational Therapy	Stephanie Flores Mentor: Sheri Michel

11:30-11:45 a.m.	The Impact of Service Dogs on the Recovery and Reintegration of Military Service Members Who Have Experienced Physical and/or Pyschological Trauma	Kaitlynn Mehus Mentor: Sheri Michel
11:45 a.m.-Noon	An Analysis of Sleep Quality in Health Science Students at Methodist University	Traci Johnson Mentors: Charlotte Navarro, Matthew Forman
Noon-12:15 p.m.	**Q&A Break**	
Noon-1 p.m.	**Lunch**	
1-1:15 p.m.	Upper Extremity Biomechanics and the Development of Rucksack Palsy in U.S. Army Soldiers	Sydney McIntyre, Lauren Sigley Mentor: Matthew Foreman
1:15-1:30 p.m.	Iterative Design and Feasibility Testing of Open-Source 3D Printed Adaptive Devices for Individuals with Parkinson's Disease	Sophia Iddings Mentor: Matthew Foreman
1:30-1:45 p.m.	Low-Cost Eye Tracking Assistive Device for Individuals with Speech and Motor Impairments: Initial Development and Testing	Kennedy Denton Mentor: Matthew Foreman
1:45-2 p.m.	Using Virtual Reality to Target Volume Reduction, Range of Motion, and Motivation in Individuals with Upper Extremity Lymphedema	Chloe Baggett, Miranda Holmes Mentors: Katherine Jones, Matthew Foreman
2-2:15 p.m.	The Feasibility of Using Immersive Virtual Reality Games with Muscular Dystrophy Population	Lindsey Frechette Mentor: Matthew Foreman
2:15-2:45 p.m.	**Q&A Break**	
2:45-3 p.m.	**Closing Remarks**	Matthew Foreman



The Seventh Annual Occupational Therapy Symposium Presentations

April 11 | 8:30 a.m.



9 - 9:15 a.m.

Beyond the Pelvis: Exploring the Experiences of Adults Living with Chronic Gynecological Conditions

Author: Darcy A. Martin-Ferguson
Mentor: Katherine Jones, Ed.D., OTR/L, CLT-LANA, CWT

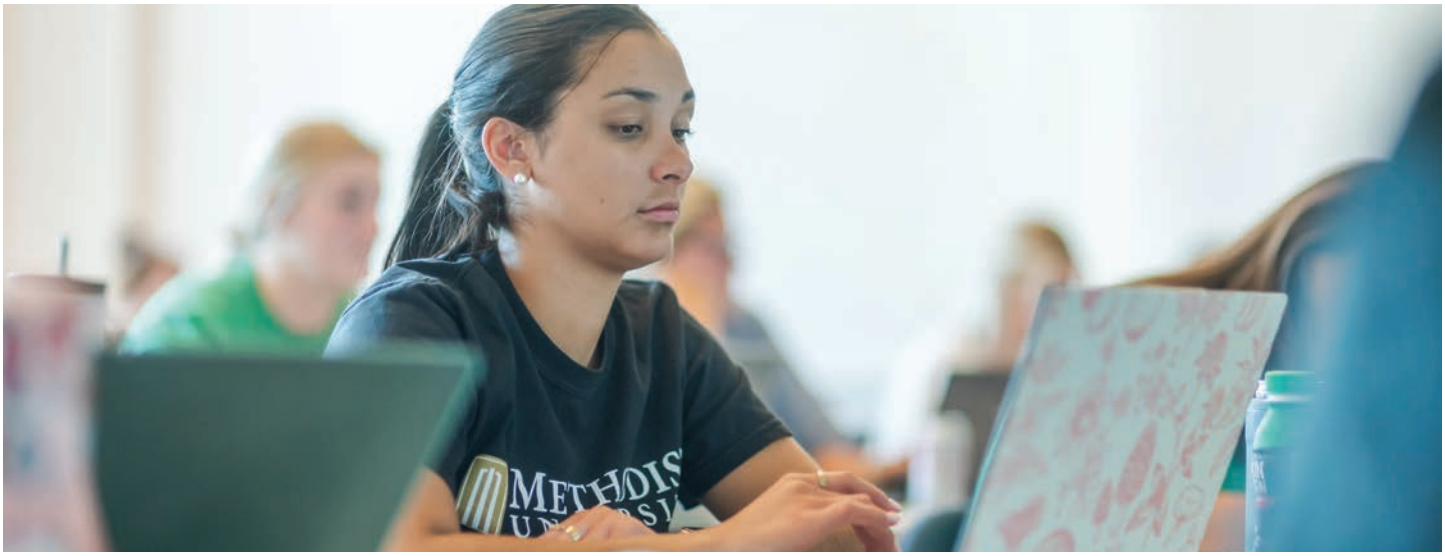
Chronic gynecological conditions are widely prevalent yet frequently underaddressed in healthcare. The purpose of this research is to utilize an occupation-based approach, shifting from a biomedical focus to a holistic strategy, to investigate how chronic gynecological conditions affect participation in meaningful roles and routines and quality of life. Using convenience sampling, this cross-sectional exploratory mixed-methods study recruited 108 participants through flyers posted in a Facebook support group. Participants were adults (≥ 18 years) who spoke and understood English and had a medical diagnosis (e.g., adenomyosis, endometriosis, polycystic ovarian syndrome, chronic post hysterectomy) or chronic pelvic symptoms lasting ≥ 6 months. Participants were excluded if they were pregnant or unable to provide informed consent. Participants completed a QuestionPro survey and an optional follow-up interview. Qualitative data were manually coded and analyzed using thematic analysis and quantitative data were analyzed in Excel using descriptive statistics. Findings indicate that chronic gynecological conditions impact participation across multiple occupations, with minimal effects on school, moderate effects on work, and significant effects on household activities, exercise, intimacy, and social participation. By highlighting the voices and lived experiences of individuals with chronic gynecological conditions, this research brings attention to existing gaps in communication, education, and access to holistic care. Findings may guide the creation of occupation-based intervention groups, the innovation of holistic healthcare models, and program development initiatives that promote more comprehensive and client-centered care.

9:15 - 9:30 a.m.

Perinatal Health and Occupational Performance in Hypermobile Ehlers-Danlos Syndrome (hEDS) and Hypermobility Spectrum Disorder (HSD)

Author: Autumn Harrington
Mentor: Katherine Jones, Ed.D., OTR/L, CLT-LANA, CWT

Pregnancy Pregnancy and childbirth can result in adverse effects on health and function, with heightened risk for those with hypermobile Ehlers-Danlos syndrome (hEDS) or hypermobility spectrum disorder (HSD) due to connective tissue fragility and joint instability. Limited research exists on perinatal health and occupational impact in this population. This study utilized a qualitative design with semi-structured interviews to explore perinatal health outcomes and occupational participation in individuals with hEDS/HSD. Participants, recruited through convenience sampling, included adults (18+) assigned female at birth with a formal diagnosis of hEDS/HSD who have had at least one birth (vaginal or cesarean). Interviews explored individual experiences and were conducted until thematic saturation was reached. Data were analyzed using thematic analysis to identify patterns in perinatal health and occupational participation in this population. Findings indicated a contrast between challenging prenatal experiences and relatively smooth birth outcomes, as well as impacts on engagement in meaningful occupations requiring additional supports, emphasizing the importance of education and self-advocacy in healthcare. This study aims to deepen understanding of perinatal health and occupational outcomes in hEDS/HSD. Limitations include convenience sampling and self-report bias. Future research should focus on intervention clinical guidelines to support this underserved population.



9:30 - 9:45 a.m.

Bridging the Gap: Addressing and Improving Health Literacy in Native American Adults from the Lumbee Tribal Community

Author: Maddison P. Oxendine
Mentor: Katherine Jones, Ed.D., OTR/L, CLT-LANA, CWT

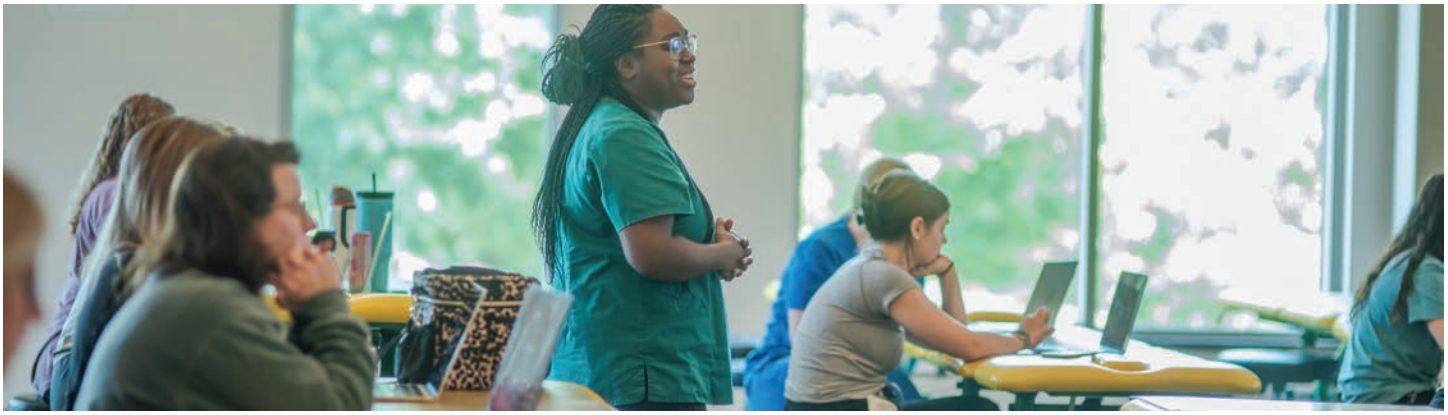
Health literacy is a key determinant of health outcomes and influences how individuals understand medical information, navigate healthcare systems, and manage chronic conditions. Native American communities, including the Lumbee Tribe of North Carolina, experience disproportionate health disparities exacerbated by limited culturally responsive education and systemic inequities. The purpose of this study was to assess functional health literacy and explore the educational needs and priorities of Lumbee Tribal adults to inform the development of culturally grounded health literacy interventions. This study used an exploratory, cross-sectional mixed-methods design. A convenience sample of Lumbee adults (ages 18+) residing in Robeson County and surrounding areas was recruited through community outreach and flyers with QR codes linking to online consent and demographic forms. Functional health literacy was measured using the Short Assessment of Health Literacy–English (SAHL-E). Participants then completed a 30-minute semi-structured interview guided by the Person–Environment–Occupation (PEO) model to explore barriers, communication preferences, and cultural considerations. Quantitative data were analyzed using descriptive statistics in Excel, and qualitative data were analyzed using inductive thematic analysis in MAXQDA. A target sample of 8-12 participants was established to achieve thematic saturation. This study addresses a critical gap in health literacy research within the Lumbee community by integrating functional assessment with participant-identified needs. Findings are expected to guide culturally responsive, occupation-based strategies that support health equity grounded in occupational therapy frameworks. Implications for occupational therapy include advancing client-centered, community-informed health education models. Future work will focus on developing and implementing sustainable interventions grounded in these findings.

9:45 - 10 a.m.

Exploring Adverse Childhood Experiences' Impact on Adulthood Interoception: An Anonymous Self-Report Survey Study

Author: Sarah Haywood
Mentors: Katherine Jones, Ed.D., OTR/L, CTL-LANA, CWT; Danielle Felak, OTD, OTR/L

Adverse Childhood Experiences (ACEs) are highly prevalent within the United States and are associated with long-term neurobiological and psychosocial development challenges. Emerging evidence theoretically links trauma and interoceptive awareness, indicating trauma exposure modulates interoceptive processing, a fundamental construct of emotional regulation, self-awareness, and occupational functioning. The study objective was to evaluate the association between total ACE scores and adult interoceptive awareness across domains of the Brief MAIA-2, hypothesizing that increased exposure to ACEs would negatively impact interoceptive awareness. A quantitative, cross-sectional, anonymous survey was conducted. Adults 18 years of age or older were recruited via community-based social media using purposive convenience sampling. Participants completed the 10-item ACE Questionnaire and the 24-item Brief MAIA-2 via a HIPAA compliant platform. Spearman's rho correlation coefficients and multiple regression analyses were used to examine the associations between cumulative ACE scores and individual interoceptive domains, evaluating potential predictive relationships. Independent sample t-tests were conducted to compare the mean scores of the Brief MAIA-2 subscales between participants who endorsed and rejected specific ACE categories. Higher cumulative ACE scores were significantly correlated with lower scores within interoceptive domains, specifically attention, self-regulation, and body trust. Findings indicated interoception serves as a pathway linking childhood adversity to adult interoceptive functioning. Results support the importance of integrating trauma-informed, interoception-focused assessment and interventions for individuals with current or past trauma exposure, advocating for occupational therapists to be recognized as essential providers in mental and behavioral health settings. Future research employing longitudinal methodologies and intervention-based frameworks to further examine the relationship between ACE exposure and multidimensional interoceptive awareness is recommended.



10 - 10:15 a.m.

An Evidence-Based Framework for Transitional Housing for Adults with Intellectual and Developmental Disabilities (IDD)

Authors: Molly Crouse, Grey Pittman, Molly Surles
Mentor: Danielle Felak, OTD, OTR/L

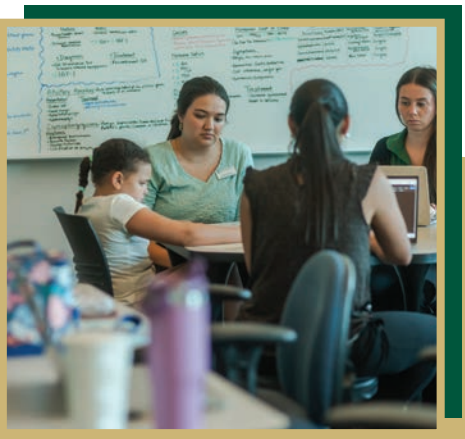
Adults with intellectual and developmental disabilities (IDD) experience higher rates of unemployment, poorer quality of life, housing instability, and reduced community participation, highlighting the need for transitional housing to address these disparities. Many transitional housing programs lack structured, evidence-based framework which impacts resident outcomes. The purpose of this study was to develop a structured, evidence-based framework for the Friendship House of Fayetteville, a transitional housing program, to facilitate objective interventions and re-evaluation assessments that prepare residents for independent living. This study used a design and development research approach. Participants included the administrative staff at the Friendship House of Fayetteville. A needs assessment, guided by Fazio's occupation-centered program development framework, was conducted during written communication, site visits, and analysis of 15 curriculum binders, intake forms and re-evaluation forms. Data was categorized by service phase (evaluation, interventions, re-evaluation, and discharge) and analyzed for standardization and correlation between evaluation results and intervention strategies. Gaps were prioritized based on their impact on independence, outcomes, and continuity of care. Results are in progress. Current findings indicate inconsistent documentation, limited standardized assessments, and lack of correlation between evaluation results and intervention planning. The findings indicate a need for a structured, evidence-based framework promoting standardized assessments, measurable outcomes, and evidence-based interventions, supporting occupational therapy's (OT) role in community-based services. The limited amount of time allotted for this study prevented the opportunity to see residents transition to independence following implementation of the framework. Future work will focus on implementation and evaluation of the framework's impact on resident independence and successful transition into independent community living.

10:45 - 11 a.m.

Occupational Therapy's Role in Supporting Hospital-to-School Transition in Pediatric Cancer Survivorship

Authors: Bayleigh Gauntt-Thompson, Kaitlyn Campbell, Alyssa Hargrove
Mentors: AJ Mullholand, OTD, OTR/L, CHT; Sheri Michel, OTD, OTR/L, CTP

Pediatric cancer survivors often experience physical, cognitive, and psychosocial challenges that negatively affect their transition from hospital to school. Although multidisciplinary reintegration programs exist, occupational therapy (OT) is not consistently integrated as standard care during this transition. The purpose of this study was to evaluate the role, utilization, and perceived impact of OT in supporting hospital-to-school transition in pediatric cancer survivorship and to examine barriers to its implementation as standard care. A cross-sectional design was used with convenience samples of caregivers and healthcare professionals recruited via email distribution and social media outreach. Eligible participants were caregivers or providers of children aged 5-18 years with a cancer diagnosis who received chemotherapy and were enrolled in public or private school. Exclusion criteria included virtual schooling, significant cognitive impairment, and selective comorbid conditions. Participants completed self-administered electronic surveys assessing OT utilization, barriers, and reintegration outcomes using Likert-scales and open-ended response. Quantitative data were analyzed with descriptive statistics, independent samples t-tests, and correlation analyses, while qualitative data underwent thematic analysis. This study addresses the gap between pediatric cancer survivorship and the role of OT in the hospital-to-school transition. Using data gathered from convenience samples of caregivers and healthcare professionals, the findings may increase awareness of OT's role in addressing chronic fatigue, psychosocial challenges, and barriers to academic and social reintegration. Future research should examine long-term reintegration outcomes to strengthen the evidence for OT in survivorship care.



11 - 11:15 a.m.

Optimizing Occupational Performance Among Special Operations Forces' Spouses During a Deployment Cycle

Author: Colleen M. Fink
Mentor: Sheri Michel, OTD, OTR/L, CTP

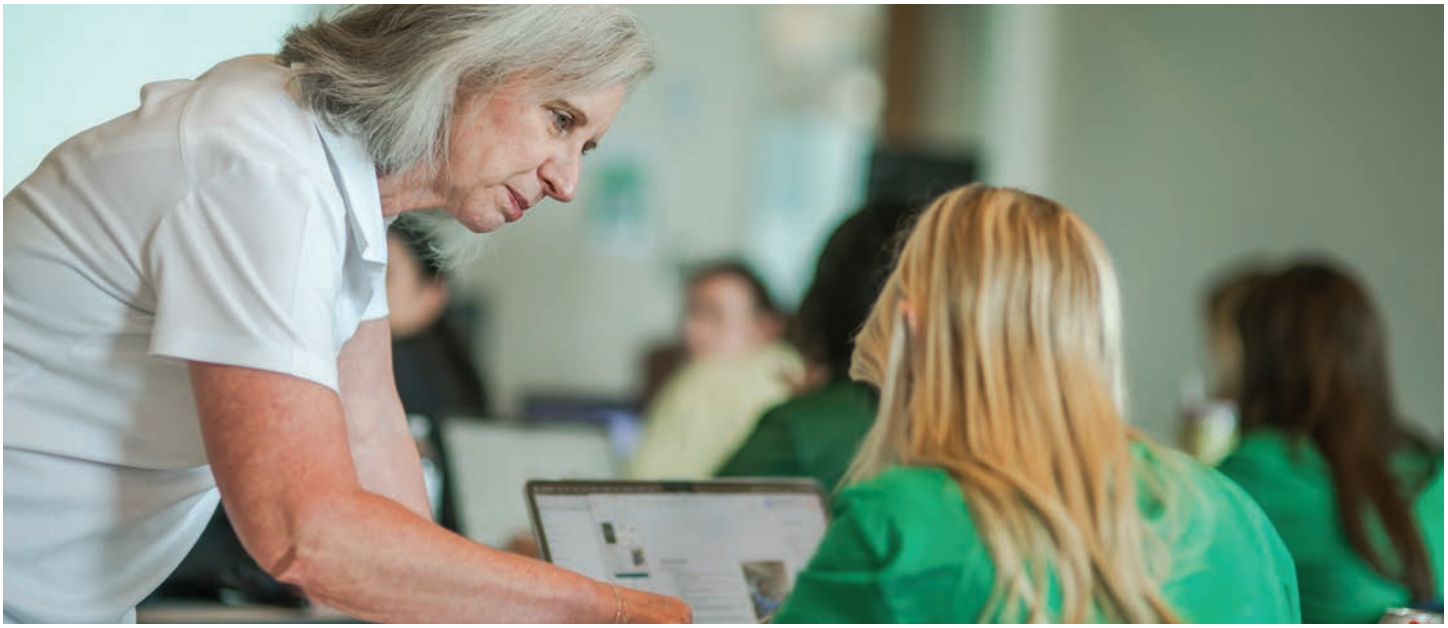
Spouses of active-duty Special Operations Forces (SOF) service members experience repeated occupational disruptions due to high operational tempo and constant deployment cycles. These stressors affect self-care, family routines, productivity, and community and social participation. This study examined factors influencing occupational performance among SOF spouses during deployment cycles to identify patterns of disruption, adaptation, and resilience. A mixed-methods design was used for this research project. Adult spouses of active-duty SOF service members (n = 42) completed an anonymous 15-20-minute survey via QuestionPro. Quantitative questions offered on a five-point Likert-scale measured role strain, self-care disruptions, sleep routines, emotional exhaustion, leisure involvement and social participation. Qualitative questions explored daily routines, perceived support, and coping strategy needs. Descriptive statistics were used for quantitative responses, and a reflexive thematic analysis was conducted for the qualitative data. Findings were then integrated using a convergent mixed-methods approach. Participants reported frequent occupational performance disruptions. Emotional exhaustion (m = 4.34), self-care changes (m = 4.24), leisure disruption (m = 4.15), family-work strain (m = 4.15), and sleep disturbances (m = 4.00) were reported as elevated. The qualitative themes included "no back up" responsibility, solo parenting burden, reduced personal time, adaptive routine restructuring, reliance on informal support networks, and unmet childcare needs. Spouses among the SOF community experience substantial occupational imbalance during deployment cycles while demonstrating a considerable amount of resilience through structured routines and community reliance. Findings from this study support development of occupation-based, community-informed interventions targeting routine stabilization, self-care preservation, and accessible childcare supports spouses often seek.

11:15 - 11:30 a.m.

Exploring Social Participation and Occupational Engagement in Spanish-Speaking Immigrant Populations with Language Barriers to Understand the Role of Occupational Therapy

Author: Stephanie Flores
Mentor: Sheri Michel, OTD, OTR/L, CTP

Language barriers contribute to occupational deprivation and social isolation among immigrants in the United States, which has 51.9 million immigrants. The purpose of this study was to explore how language barriers shape occupational engagement and social participation among Spanish-speaking immigrants in the United States, leading to reduced community integration and a lack of resources. This mixed-methods study recruited five Spanish-speaking immigrants. Participants completed a PEOP-based survey via QuestionPro, inquiring about their perception of occupational engagement and social participation and the impact of language barriers. One individual participated in a 30-minute interview that further explored lived experiences and the way language barriers have shaped opportunities for meaningful engagement within important occupations. Descriptive statistics and common themes were analyzed. Findings emphasized occupational therapy's role in developing community groups in which interventions target social participation and occupational justice for Spanish-speaking immigrants. Limitations for this study include a small sample size. Future research should focus on recruiting a larger sample size and investigating the benefits of occupational therapy interventions for this population.



11:30 - 11:45 a.m.

The Impact of Service Dogs on the Recovery and Reintegration of Military Service Members Who Have Experienced Physical and/or Psychological Trauma

Author: Kaitlynn Mehus
Mentor: Sheri Michel, OTD, OTR/L, CTP

Military service members with trauma commonly face ongoing occupational challenges, with limited research on the effectiveness of service dogs and barriers to access. The purpose of this study was to evaluate how service dogs impact psychological health, daily functioning, and community reintegration, while identifying barriers, supports, and unmet needs to improve accessibility, effectiveness, and long-term support for military service members. This mixed-methods study examined how partnering with a service dog after trauma impacts military members beyond symptom relief. Participants, recruited via social media posts and flyers, included current or honorably discharged U.S. Armed Forces personnel with at least six months of experience with a trained service dog and the ability to independently consent. Data were collected anonymously using QuestionPro, with interviews transcribed and validated. All data were securely stored in accordance with IRB standards. Quantitative results were summarized with descriptive statistics, while qualitative data were thematically analyzed and integrated. Research shows that service dogs enhance recovery for trauma-experienced military members by improving psychological and physical health, increasing occupational performance and engagement. Occupational therapists can use this evidence to promote integration of service dogs into rehabilitation processes. Future studies should explore the specific training medical professions receive and resources regarding service dog implementation and education for clients.

11:45 - Noon

An Analysis of Sleep Quality in Health Science Students at Methodist University

Author: Traci Johnson
Mentors: Charlotte Navarro, OTD, OTR/L; Matthew H. Foreman, Ph.D.

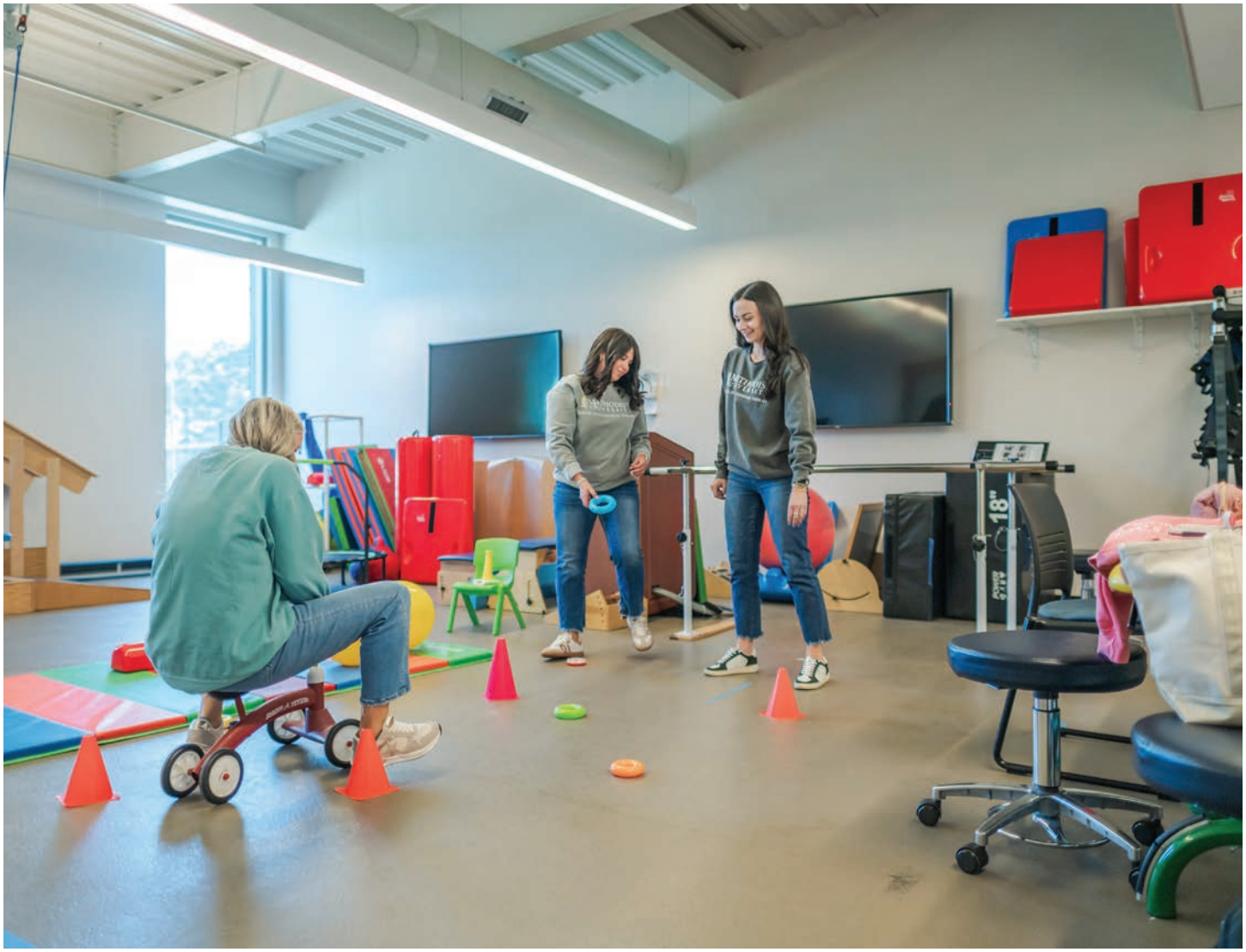
Health science students can experience stress, anxiety, and sleep disruptions at different points of their programs due to workload and examination periods. The purpose of this study was to assess variations in sleep quality in health science students over the course of a single semester. This was a longitudinal, mixed-method study design involving students in the Doctor of Occupational Therapy, Occupational Therapy Assistant, Doctor of Physical Therapy, Nursing, and Physician's Assistant programs at Methodist University. To be included, students had to be enrolled in one of these programs, be 18 years of age or older, and have a smartphone or smart device capable of downloading applications. Students were invited to participate via a recruitment flyer distributed through email. Interested participants were asked to provide informed consent and complete a baseline survey via email. They were instructed to download the SleepScore application on their phone. Each sequential week for four weeks, participants received a weekly survey to input data from the SleepScore app. Following the four weeks of surveys, participants received an exit survey that consisted of the same questions as the baseline survey to use as an outcome measure. All surveys were conducted using QuestionPro software. A major limitation of this study was participants' adherence to reporting. Future methods may include more automated engagement to maintain participation and provide reminders. The goal of this project was to add the body of knowledge and provide insight for curriculum alterations to prioritize sleep hygiene for health science students at Methodist University.

1 - 1:15 p.m.

Upper Extremity Biomechanics and the Development of Rucksack Palsy in U.S. Army Soldiers

Authors: Sydney McIntyre, Lauren Sigley
Mentors: Matthew H. Foreman, Ph.D.; AJ Mullholand, OTD, OTR/L, CHT

Ruck marching is a mandatory component of physical readiness in the U.S. Army, requiring service members to carry heavy loads to maintain mission performance. Prolonged load carriage places substantial mechanical stress on the shoulder girdle and brachial plexus. This can result in rucksack palsy, a neuropathy that can cause upper extremity weakness, numbness, scapular winging, and long-term functional impairment. This study aimed to objectively examine postural deviations and compensatory movement patterns during rucksack carriage and identify biomechanical factors associated with rucksack palsy. A mixed-methods study was conducted to assess deficits in occupational performance resulting from rucksack-related upper extremity injury in current U.S. Army service members (active duty, reserve, or National Guard). Participants were excluded for language barriers, severe cognitive dysfunction, a prior, major, unrelated upper extremity condition, or less than one year of service. Convenience sampling was used to identify participants for an online survey and an optional, in-person biomechanical analysis. The survey portion was administered on QuestionPro and involved questions related to injury history, performance deficits, and pain. The in-person portion asked participants to complete a set of occupation-based activities with and without a rucksack while being recorded by motion capture cameras. This study seeks to investigate the contribution of upper extremity biomechanics to brachial plexus stress during load carriage. Findings may support the development of targeted occupational therapy interventions, including load carriage, rucksack strap modifications, and early symptom screening to reduce injury risk. Future research will expand sample size and evaluate prevention-based training protocols.



1:15 - 1:30 p.m.

Iterative Design and Feasibility Testing of Open-Source 3D Printed Adaptive Devices for Individuals with Parkinson's Disease

Author: Sophia Iddings
Mentor: Matthew H. Foreman, Ph.D.

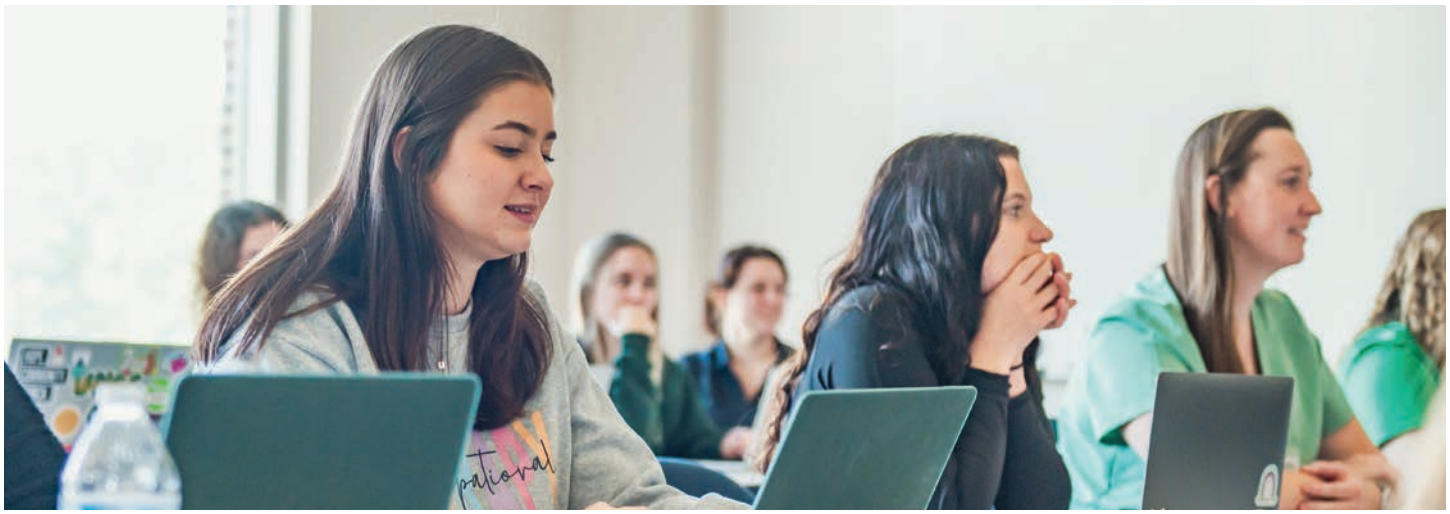
Three-dimensional (3D) printing is an emerging trend in occupational therapy (OT) practice that has a variety of uses. One use involves printing adaptive devices to assist people with deficits in hand function, such as individuals with Parkinson's disease (PD). The purpose of this study was to design, print, and gather feedback on various 3D-printed designs for grip adaptation for individuals with PD. This feasibility study utilized mixed-methods techniques to gather data from OT stakeholders and individuals with PD. Participants with PD who were included in this study met the following criteria: have a PD diagnosis, be 55 years old or older, and be able to understand, write, and read in English. All participants were presented with nine 3D-printed built-up grips and tasked with completing a simulated feeding task of scooping Legos out of a bowl. After interacting with each device, the participants filled in a Pugh chart and rated design characteristics on a 10-point Likert scale (1 = poor, 10 = perfect). Data were entered into Excel and underwent statistical cluster analysis to identify any similarities or differences between participants' ratings. The similarities and differences between ratings completed by OT stakeholders and an individual with PD provides insight on how similarly or differently characteristics were rated. A limitation of this study was the sample size, specifically the number of participants with PD. This indicates results may not apply to the wider population of individuals living with PD. Future research is needed to explore the benefits of collaborating with individuals with PD to decrease the discrepancies between ratings.

1:30 - 1:45 p.m.

Low-Cost Eye Tracking Assistive Device for Individuals with Speech and Motor Impairments: Initial Development and Testing

Author: Kennedy Denton
Mentor: Matthew H. Foreman, Ph.D.

Augmentative and alternative communication (AAC) strategies allow individuals with speech and motor impairments to communicate without verbalization. Eye tracking technology (ETT) is one such strategy that utilizes cameras and software to facilitate communication and environmental interaction through eye movement. The purpose of this project was to develop and test the feasibility of novel, low-cost ETT for communication and participation. The Tobii Eye Tracker 5 was combined with freely available software for hands-free computer interaction (Talon) and dwell clicking (Abili) to create an accessible and custom ETT scheme. This study utilized students from Methodist University for prototyping and a single individual with speech and motor deficits for a use case. Through an iterative design process, our custom ETT strategy was first tested with students to improve the functionality and usability of the device. Students rated a set of metrics, in the style of a Pugh chart, using a five-point Likert scale to provide feedback. Feedback was implemented into subsequent prototyping and iteratively tested with students until our ETT technology reached certain milestones. Next, the technology was introduced to a single individual with speech and motor impairments to obtain general observational performance metrics and stakeholder feedback. The short-term goal of this project was to create an accessible, do-it-yourself strategy for ETT that could be used by individuals that may not qualify for more expensive AAC devices. The long-term goal of this work was to show that low-cost ETT can improve the participation and engagement of individuals with speech and motor impairments.

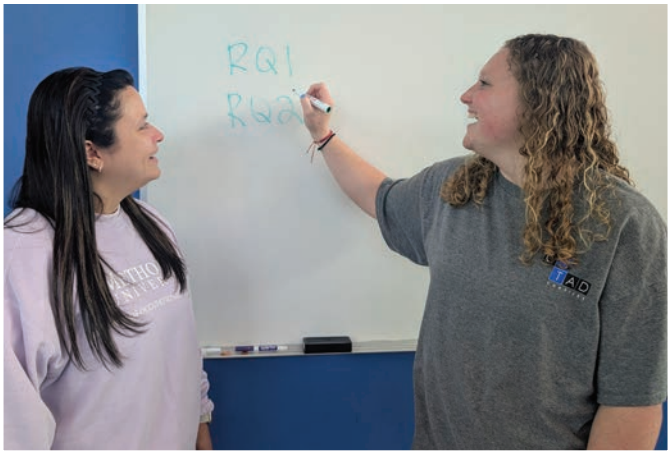


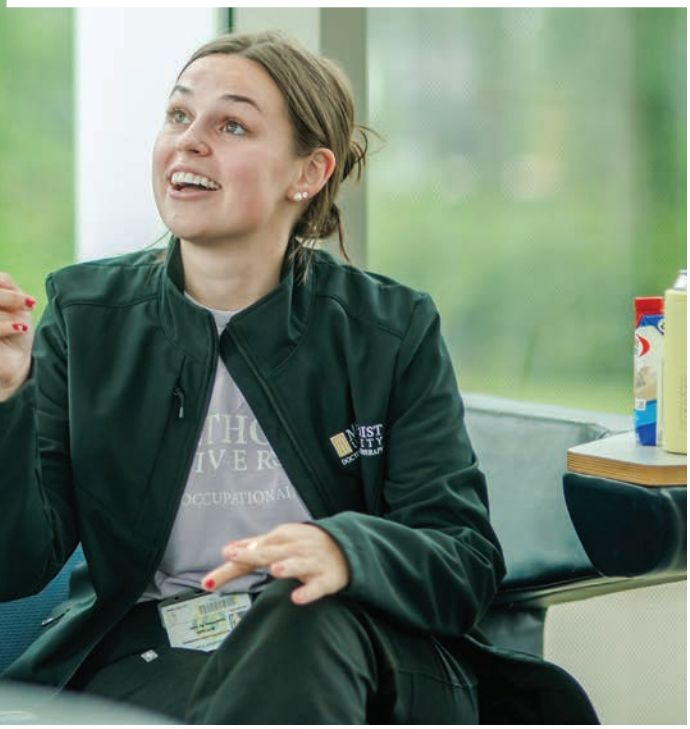
1:45 - 2 p.m.

Using Virtual Reality to Target Volume Reduction, Range of Motion, and Motivation in Individuals with Upper Extremity Lymphedema

Authors: Chloe Baggett, Miranda Holmes
Mentor: Katherine Jones, Ed.D., OTR/L, CLT-LANA, CWT

Upper extremity (UE) lymphedema is a chronic condition that negatively affects wellbeing by limiting range of motion (ROM), increasing limb volume, and reducing motivation. Standard UE lymphedema treatment often involves repetitive exercises and self-management strategies that can be difficult to maintain overtime. This study examined the effects of a virtual reality (VR) exercise program, compared with standard lymphedema exercise, on motivation, limb volume, and ROM in adults with UE lymphedema. This single subject randomized trial included individuals with UE lymphedema, who were able to lift their arms to shoulder height, reach forward, grasp objects bilaterally, tolerate a VR headset and short-stretch compression bandaging for 30 minutes, and follow multistep directions. Participants were excluded if they were receiving active lymphedema therapy, or had a history of epilepsy, seizures, migraines, motion sickness, or serious medical conditions. Participants completed two sessions consisting of pre- and post- measurements of ROM and limb volume, either a 30-minute VR-based or standard exercise intervention with compression bandaging, and completion of the Intrinsic Motivation Inventory (IMI) following the intervention. Data were collected and analyzed using Excel. This study indicated that VR-based exercise may be a feasible and motivating adjunct treatment to standard upper extremity lymphedema exercises. The use of VR is innovative in addressing motivation and improving ROM. For OT practice, VR offers a client-centered approach to support engagement and functional movement. Limitations included a small sample size and short intervention duration. Future research should examine long-term outcomes with larger samples.





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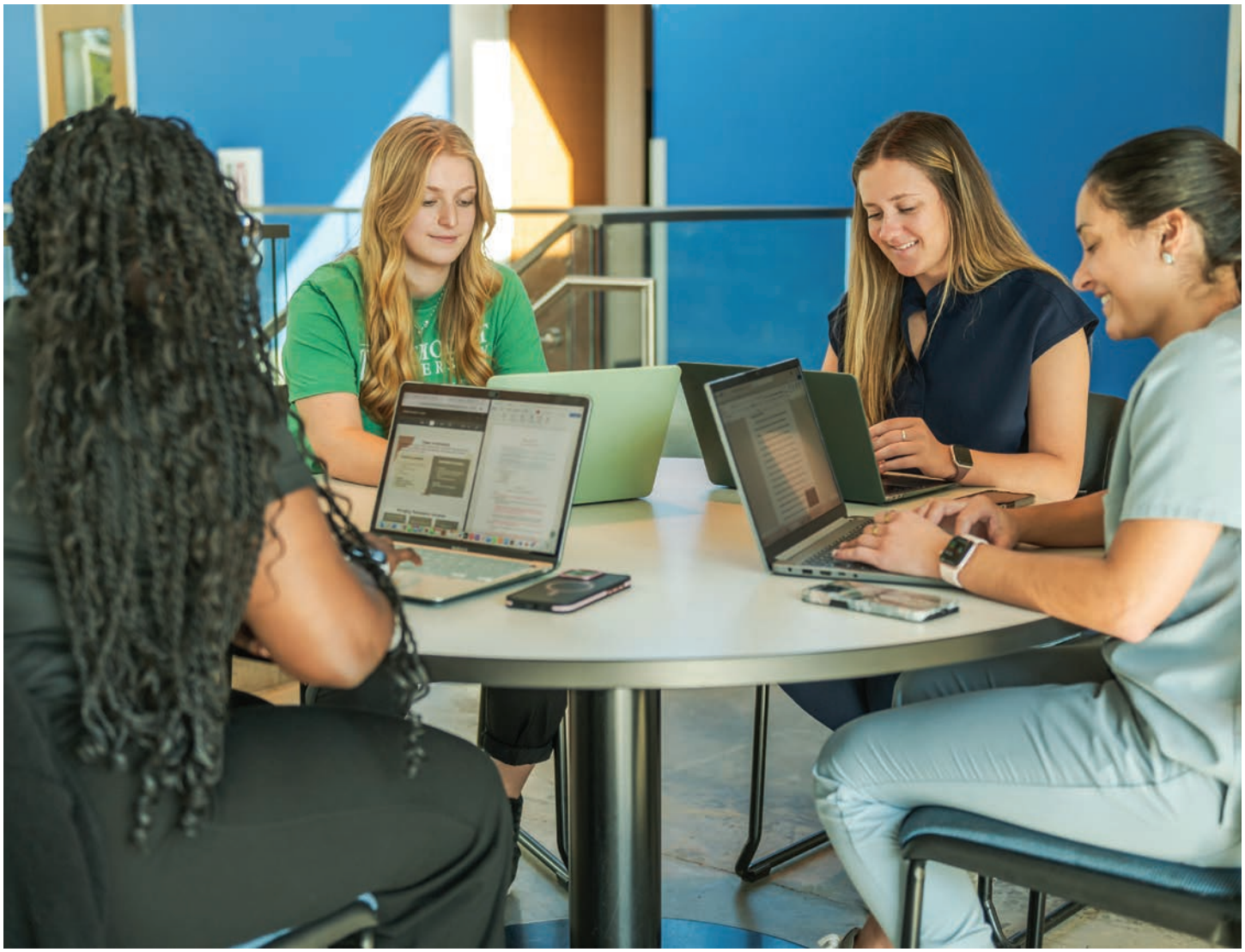
The Feasibility of Using Immersive Virtual Reality Games with Muscular Dystrophy Population

Author: Lindsey Frechette
Mentor: Matthew H. Foreman, Ph.D.

Muscular dystrophy (MD) is a rare neuromuscular disease that is characterized by progressive muscle degeneration. Immersive virtual reality (VR) is an emerging trend in healthcare that has the potential to motivate individuals with MD to participate in neurorehabilitation to increase functional independence. The purpose of this study is to investigate immersive VR as the basis of a neuromotor intervention for individuals with MD. This study was a feasibility trial that used convenience sampling to recruit participants. Participants were eligible if they had an MD diagnosis, did not have any other impairments, and were not participating in another study. Using the Meta Quest 3 headset, participants played three games for a total of 45 minutes. Outcomes were measured through self-rated assessments and a semi-structured interview. Assessments were scored and entered into Excel for further interpretation and statistical analysis. Descriptive statistics were run to analyze averages for assessments amongst participants. A total of three participants with a diagnosis of fascioscapulohumeral MD completed this study. Main findings showed that VR has the potential to motivate individuals with MD to participate in neuromotor therapy. Participants reported that the immersive VR system was innovative, fun, motivational, and engaging. This shows that immersive VR is an emerging technology that is feasible to use as the basis of intervention strategies for individuals with MD. Limitations of the study included a small, homogenous sample (n=3) and technological issues. Future studies should have a pretest-posttest design to determine if immersive VR has implications on maintaining motor function over time.



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