YI-TING TZEN, PHD

Curriculum Vitae February 2024

Department of Applied Clinical Research School of Health Professions University of Texas Southwestern Medical Center

Email: Yi-Ting.Tzen@UTSouthwestern.edu

EMPLOYMENT

2019-present Assistant Professor

Department of Applied Clinical Research

Department of Orthopedic Surgery

Department of Physical Medicine and Rehabilitation University of Texas Southwestern Medical Center

2014-2019 Assistant Professor

Department of Physical Therapy University of Illinois at Chicago

EDUCATION

2011-2014 Post-doctoral Associate

University of Pittsburgh

2010 Ph.D., Rehabilitation Science

University of Pittsburgh

2008 M.S., Rehabilitation Science & Technology

University of Pittsburgh

2005 B.S., Physical Therapy

National Taiwan University

CERTIFICATION

2006 Rehabilitation Technology, University of Pittsburgh

GRANTS

1. Novel shear wave elastography based radiomics for early detection and monitoring of spinal cord injury-induced heterotopic ossification

Role: Co-investigator (PI: Yen-Sheng Lin)

Amount: \$200 k

Funding period: 2024-2026

Funding Agency: Paralyzed Veterans of America Research Foundation (#3201)

2. Prognostic factors for the development of imaging-derived rotator cuff myosteatosis: a pilot study

Role: co-Principal investigator Amount: \$20 k

Funding period: 2022-2024

Funding Agency: UT Southwestern School of Health Professions Interdisciplinary

Research Grant Program

3. Pressure ulcer modifiable risk identification using blood flow marker and metabolic biomarkers in people with SCI.

Role: Principal investigator Amount: \$150 k

Funding period: 2021-2023

Funding Agency: Paralyzed Veterans of America Research Foundation (#3180)

4. Effect of alternating pressure overlay on weight bearing tissue tolerance in people with SCI.

Role: Principal investigator Amount: \$49 k

Funding period: 2017-2019

Funding Agency: Dabir Surface Inc.

5. Effectiveness of single-legged ergometer exercise on diabetic foot ulcer healing.

Role: Principal investigator Amount: \$20 k

Funding period: 2016-2017

Funding Agency: UIC College of Applied Health Sciences Interdisciplinary Pilot Grant

6. Perfusion biomarkers for ulcer risk assessment in SCI

Role: Principal investigator Amount: \$5 k

Funding period: 2015-2017

Funding Agency: National Pressure Injury Advisory Panel

Implementing local cooling on pressure ulcer prevention in people with spinal cord injury

Role: Principal investigator Amount: \$100 k

Funding period: 2013-2015

Funding Agency: Paralyzed Veterans of America Research Foundation (#2905)

8. Rehabilitation Engineering and Research Center on Spinal Cord Injury (PI: Brienza)

Role: Co-investigator (PI: David Brienza) Amount: \$4.75 M

Funding period: 2007-2013

Funding Agency: National Institute of Disability and Rehabilitation Research

(#H133E070024)

9. Estimating the relative effects of pressure, shear, and temperature on skin tissue stress as measured by reactive hyperemia.

Role: Co-investigator (PI: David Brienza)

Amount: \$150 k

Funding period: 2010-2012

Funding Agency: Hill-Rom Corp.

PEER REVIEWED PUBLICATIONS

- 1. **Tzen YT**, Brienza DM, Karg P, Loughlin P (2010). Effect of local cooling on sacral skin perfusion response to pressure: implications for pressure ulcer prevention. Journal of Tissue Viability,19,3,86-97.
- 2. Lachenbruch C, **Tzen YT**, Brienza DM, Karg P, Lachenbruch PA (2013). The relative contribution of interface pressure, shear stress, and temperature on tissue ischemia: a cross-sectional pilot study. Ostomy Wound Management, 59,3,25-34.
- 3. Solovyev A, Mi Q, **Tzen YT**, Breizna DM, Vodovotz Y (2013). Hybrid Equation-/ Agent-based model of ischemia-induced hyperemia and pressure ulcer formation predicts greater propensity to ulcerate in subjects with spinal cord injury. PLos Comput Biol, 9,5,e1003070.
- 4. **Tzen YT**, Brienza DM, Karg P, Loughin P (2013). Effectiveness of local cooling for enhancing tissue ischemia tolerance in people with spinal cord injury. Journal of Spinal Cord Medicine, 36,4,357-64.
- 5. Lachenbruch C, **Tzen YT**, Brienza DM, Karg PE, Lachenbruch PA (2015). Relative contributions of interface pressure, shear stress, and temperature on ischemic-induced skin-reactive hyperemia in healthy volunteers: a repeated measures laboratory study. Ostomy Wound Management, 61,2,16-25.
- 6. Krishnan S, Brick R, Karg PE, **Tzen YT**, Garber SL, Sowa G, Brienza DM (2016). Predictive validity of the spinal cord injury pressure ulcer scale (SCIPUS) in acute care and inpatient rehabilitation following traumatic spinal cord injury. NeuroRehabilitation, 38,4,401-9.
- 7. **Tzen YT**, Weinheimer-Haus EM, Corbiere TF, Koh TJ (2018). Increase skin blood flow during low intensity vibration in human participants: analysis of control mechanisms using short-time Fourier transform. PLoS ONE, 13(7): e0200247.
- 8. **Tzen YT**, Brienza DM, Karg P (2019). Implementing local cooling to increase skin tolerance to ischemia during normal seating in people with spinal cord injury. Journal of Tissue Viability, 28,4,173-8.
- 9. **Tzen YT**, Purohit R*, Mei S*, Tan WH (2020). Assessing skin blood flow and interface pressure in patients with spinal cord injury provided an alternating pressure overlay: a cross-sectional study. Wound Management and Prevention, 66(3):16-28.
- 10. Van Beest D, Koh S, **Tzen YT**, Wang J, Moore-Matthews D, Kargel JS, Cutrell JB, Bedimo R, Bennett BR, Tan WH (2022). Healthcare utilization and outcomes of spinal cord injured veterans with stage III-IV pressure injuries. Journal of Spinal Cord Medicine, 1-9. doi: 10.1080/10790268.2022.2052500 [ePub ahead of print]

- 11. **Tzen YT**, Champagne PT*, Rao V*, Wang J, Tan WH, Klakeel M, Jain NB, Wukich DK, Koh, TJ (2022). Utilisation of skin blood flow as a precursor for pressure injury development in persons with acute spinal cord injury: a proof of concept. International Wound Journal, 19(8):2191-2199. doi: 10.1111/iwj.13829.
- 12. Krishnan S, Hong I, Grace C, **Tzen YT**, Reistetter T. (2022) Pressure injury on post-stroke admission assessment to skilled nursing facilities: risk factors, management, and impact on rehabilitation. J Am Med Dir Assoc, 23(10):1718.e13-1718.e20. Doi: 10.1016/j.jamda.2022.06.025. [ePub ahead of print]
- 13. Champagne PT*, **Tzen YT**, Wang J, Bennett B, Van Beest D, Tan WH (2023). Predictors of one year pressure injury outcomes in hospitalized spinal cord injured Veterans with one stage 3 or 4 pressure injury. Journal of Spinal Cord Medicine. 1-7. doi: 10.1080/10790268.2022.2158290. [ePub ahead of print]
- 14. Nasr AJ*, Pierson CJ*, **Tzen YT**, Khazzam M, Jain NB, Lin YS (2023). Emerging role of quantitative ultrasound-based imaging techniques for characterizing rotator cuff tears: a scoping review. Diagnostics (Basel), 13(12):2011.
- 15. **Tzen YT**, Sambandam S, Delmore B, Wang J, Chu A, Wukich D (2023). Clinical risk factors of perioperative pressure injury in older adult patients with hip fracture. Advances in Skin and Wound Care, 36(12):642-650.
- 16. **Tzen YT,** Champagne PT*, Wang J, Klakeel M, Tan WH, Bogie KM, Koh TJ (2024). Markers for pressure injury risk in people with chronic spinal cord injury: a pilot study. Advances in Skin and Wound Care. *Accepted*.

CONFERENCE PROCEEDINGS

- 1. **Tzen YT**, Jan YK, Brienza DM (2008). *Development of a system to study the effect of local cooling on skin blood flow response to interface pressure.* Proceedings of the RESNA 31st International Conference on Technology and Disability. Washington, DC: RESNA Press.
- Tzen YT, Jan YK, Porach EA, Karg PE, Brienza DM (2009). Effects of local cooling on sacral skin perfusion response to pressure: implications for pressure ulcer prevention. Proceedings of the National Pressure Ulcer Advisory Panel Biennial Conference. Washington, DC: NPUAP Press.
- 3. **Tzen YT**, Loughlin PJ, Brienza DM (2009). *Analyzing the mechanisms of local cooling on pressure induced reactive hyperemia by applying short-time Fourier transform*

^{*}Indicates trainee or student

- (STFT). Proceedings of the RESNA 32nd International Conference on Technology and Disability. New Orleans, LA: RESNA Press.
- 4. Glauser K, **Tzen YT**, Brienza DM (2009). *Pressure ulcer prevention: examining the relative effects of pressure, shear force, and skin temperature.* Proceedings of the University of Pittsburgh Science 2009 Annual Conference. Pittsburgh, PA.
- 5. **Tzen YT**, Brienza DM, Karg PE, Loughlin PJ, Geyer MJ (2010). *Effectiveness of local fast and slow cooling on pressure induced reactive hyperemia (RH) in adult human participants.* Proceedings of the RESNA 33rd International Conference on Technology and Disability. Las Vegas, NV: RESNA Press.
- 6. **Tzen YT**, Brienza DM, Karg PE, Loughlin PJ, Geyer MJ (2011). *Effectiveness of local cooling on enhancing tissue ischemia tolerance in people with spinal cord injury.*Proceedings of the National Pressure Ulcer Advisory Panel Biennial Conference. Las Vegas, NV: NPUAP Press.
- 7. **Tzen YT**, Brienza, DM, Karg PE (2011). *Effects of sensation and autonomic function on reactive hyperemia following pressure with and without cooling in people with spinal cord injury*. International Conference of Spinal Cord Medicine and Rehabilitation. Washington, DC: ISCoS/ASIA Press.
- 8. **Tzen YT**, Brienza DM, Lachenbruch C, Karg PE (2012). *Relative contribution of pressure, temperature and shear force on ischemia induced skin blood flow response.* Proceedings of the European Pressure Ulcer Advisory Panel Focus Meeting. Tel Aviv, Israel: EPUAP Press.
- 9. Lachenbruch C, **Tzen YT**, Brienza DM, Karg PE, Lachenbruch PA (2013). *Relative effect of pressure, temperature, shear on non-damaging tissue ischemia.* Proceedings of the International Seating Symposium. Nashville, TN: ISS Press.
- 10. Tzen YT, Brienza DM, Karg PE (2015). Implementing temperature control on support surface: a real-world seating test protocol on people with spinal cord injury. Proceedings of the National Pressure Ulcer Advisory Panel Biennial Conference. Orlando, FL: NPUAP Press.
- 11. **Tzen YT**, Brienza DM, Karg PE (2016). Positive effects of local cooling on ischial skin ischemia during normal seating in people with SCI. Proceedings of the American Congress of Rehabilitation Medicine conference. Chicago, IL: ACRM Press.
- 12. Tzen YT, Weinheimer-Haus E, Corbierre T, Koh T (2016). Effectiveness of low intensity vibration on skin blood flow response: implication for wound healing. Proceedings of the American Congress of Rehabilitation Medicine conference. Chicago, IL: ACRM Press.
- 13. Rao V*, **Tzen YT** (2017). The relationship between microcirculation, autonomic function and sacral pressure injury history in people with chronic spinal cord injury.

- Proceedings of the National Pressure Ulcer Advisory Panel Biennial Conference. New Orleans, LA: NPUAP Press.
- 14. **Tzen YT**, Kataria A, Rao V*, Joseph K, Lee R, Dysico G (2018). Microcirculatory biomarker for pressure injury risk in acute spinal cord injury (SCI) patients. Proceedings of the National Pressure Ulcer Advisory Panel Annual Conference. Las Vegas, NV: NPUAP Press.
- 15. Purohit RM*, Mei S*, Kataria A, **Tzen YT** (2018). Assessing alternating pressure overlay on skin blood flow and interface pressure: a feasibility study on people with spinal cord injury (SCI). Proceedings of the National Pressure Ulcer Advisory Panel Annual Conference. Las Vegas, NV: NPUAP Press.
- 16. **Tzen YT,** Purohit RM*, Mei S* (2019). Using alternating pressure overlay as a ischemia precondition strategy for pressure ulcer prevention in operation room: a pilot study. Proceedings of the National Pressure Ulcer Advisory Panel Annual Conference. St Louis, MO: NPUAP Press.
- 17. Purohit RM*, Mei S*, **Tzen YT** (2019). Effectiveness of alternating pressure overlay on skin blood flow and interface pressure in people with spinal cord injury. Proceedings of the Wound Ostomy and Continence Nurses Society Annual Conference. Nashville TN: WOCN Press.
- 18. Krishnan S, Hong I, **Tzen YT**, Couture G, Reistetter T (2020). Characteristics and rehabilitation utilization of preexisting superficial and deep pressure injury among stroke elderly admitted to skilled nursing facilities. National Pressure Injury Advisory Panel Annual Conference. Houston, TX: NPIAP Press.
- 19. Van Beest D, Koh S, **Tzen YT**, Wang J, Kargel J, Cutrell J, Bedimo R, Bennett B, Tan WH (2021). Clinical characteristics of spinal cord injured veterans hospitalized with stage 3 or 4 pressure injuries. National Pressure Injury Advisory Panel Annual Conference. Virtual: NPIAP Press.
- 20. Lima NS*, **Tzen YT**, Clifford P (2022). Spectral changes in skin blood flow do not reflect pressure manipulations. Experimental Biology 2022 Conference. Philadelphia, PA.
- 21. Champagne PT*, **Tzen YT**, Wang J, Tan WH (2022). Predictors of one year pressure injury outcomes in hospitalized spinal cord injured veterans. 2022 American Congress of Rehabilitation Medicine Annual Conference. Chicago, IL.
- 22. **Tzen YT**, Sambandam S, Delmore B, Wang J, Wukich D (2023). Clinical risk factors of perioperative pressure injury in older adult patients with hip fracture. 2023 Orthopaedic Research Society Annual Conference. Dallas, TX.
- 23. Lin Y, Nasr A*, Prabhu K, **Tzen YT**, Khazzam M, Jain NB (2023) Emerging role of quantitative ultrasound-based imaging for characterizing rotator cuff tears: a systematic review. Orthopaedic Research Society Annual Conference. Dallas, TX.

24. **Tzen YT**, Delmore B, Champagne PT*, Sambandam S, Wukich D (2023). Clinical risk factors of partial and full-thickness pressure injuries in older adults with hip fracture. 2023 National Pressure Injury Advisory Panel Annual Conference. San Diego, CA.

PATENT

1. Brienza DM, Karg PE, Smeresky, D, **Tzen YT**. Temperature regulating footwear. (US20180295930A1, WO2017062636A1)

HONORS AND AWARDS

2023	Research Recognition Award, UT Southwestern School of Health Professions
2022	Department of Applied Clinical Research Outstanding Mentor Award, UT Southwestern School of Health professions
2014	Advanced Rehabilitation Research Training Fellowship, National Institute on Disability and Rehabilitation Research training program at University of Pittsburgh
2013	McGowan Institute for Regenerative Medicine Publication of the month with Dr. A Solovey, Dr. Q Mi, Dr. Y Vodovotz, and Dr. DM Brienza
2011	Winner, Roberta Abruzzese Award, National Pressure Ulcer Advisory Panel (NPUAP)
2011	Honorable Mention, New Investigator Poster Award, NPUAP Biennial Conference
2010	Winner, Student Scientific Paper Competition, Rehabilitation Engineering and Assistive Technology Society of North America (RESNA) Annual Conference
2010	First runner-up, Interprofessional Student Competition with Becky Faett, Diana Ross, and Gijsberta van Londen, University of Pittsburgh
2009	First place, Graduate Student Elevator Pitch Competition with Matthew Lee, Quality of Life Technology Center, University of Pittsburgh/Carnegie Mellon University
2009	Poster presentation finalist, NPUAP Biennial Conference
2005	Academic Award, National Taiwan University

^{*}Indicates trainee or student

INVITED LECTURES/WORKSHOPS/PODIUM PRESENTATIONS

- Building the future: emerging leaders update. National Pressure Injury Advisory Panel Annual Conference, February 17.
- 2024 Rotator cuff myosteatosis: a multimodal musculoskeletal imaging study. Capra Interdisciplinary Healthcare Symposium, UT Southwestern Medical Center, February 14.
- Markers for pressure injury in patients with spinal cord injuries. National Pressure Injury Advisory Panel Annual Conference, March 17.
- NPIAP Emerging Leader Task Force Initiative. National Pressure Injury Advisory Panel Annual Conference, March 18.
- Pressure injuries in spinal cord injury population. National Pressure Injury Advisory Panel <u>Podcast</u> on RN Huddle, University of Nebraska Medical Center. Feb 3.
- 2020 Rehabilitation technology for pressure injury prevention. Capra Interdisciplinary Healthcare Symposium, UT Southwestern Medical Center, February 12.
- 2019 Pressure injury risk assessment and prevention: a microcirculatory approach.

 Department of Physical Medicine & Rehabilitation Grand Rounds Lecture, UT

 Southwestern Medical Center, December 6.
- 2019 Effectiveness of alternating pressure overlay on skin blood flow and interface pressure in people with spinal cord injury. Wound Ostomy and Continence Nurses Society Annual Conference, June 26.
- 2016 Microcirculatory approach to chronic wound prevention and healing. Center for Wound Healing and Tissue Regeneration, College of Dentistry, University of Illinois at Chicago, December 8.
- 2016 Chronic wound prevention, early detection, and healing: current strategies and challenges. Department of Physical Therapy Seminar, University of Illinois at Chicago, November 17.
- Integumentary Management: from Bench to Bedside. School and Institute of Physical Therapy, National Taiwan University, Dec 31.
- 2014 Pressure ulcer research a multidisciplinary team approach. Integrative Physiology Laboratory Seminar, University of Illinois at Chicago, September 12.
- Relative effect of pressure, temperature, shear on non-damaging tissue ischemia. International Seating Symposium Annual Conference, March 5-9.
- Assistive Technology and Rehabilitation Engineering Design Workshop. School and Institute of Physical Therapy, National Taiwan University, Dec 24.

- 2011 Effects of sensation and autonomic function on reactive hyperemia following pressure with and without cooling in people with spinal cord injury. ISCoS/ASIA Annual Conference, June 4-8.
- Pressure ulcer research at University of Pittsburgh: application of local cooling and signal processing. School and Institute of Physical Therapy, National Taiwan University, May 9.
- 2011 Effectiveness of local cooling on enhancing tissue ischemia tolerance in people with spinal cord injury. NPUAP Biennial Conference, Feb 25-26.
- 2010 Effectiveness of local fast and slow cooling on pressure induced reactive hyperemia in adult human participants. RESNA Annual Conference, June 26-30.
- Analyzing the mechanisms of local cooling on pressure induced reactive hyperemia by applying short-time Fourier transform. RESNA Annual Conference, June 23-27.
- 2008 Effects of local cooling on skin perfusion response to pressure: implications to pressure ulcer prevention. School and Institute of Physical Therapy, National Taiwan University, Dec 30.
- Development of a system to study the effect of local cooling on skin blood flow response to interface pressure. RESNA Annual Conference, June 26-30.
- 2007 Assistive Technology: from Practice to Research Experience at U. Pitt. School and Institute of Physical Therapy, National Taiwan University, May 30.

TEACHING EXPERIENCE

- 2023-present Scientific Communication II (ACR 5115, Fall: 1 credit)

 Department of Applied Clinical Research, UT Southwestern Medical Center
- 2023-present Grant Writing II (ACR 5102, Summer: 1 credit)

 Department of Applied Clinical Research, UT Southwestern Medical Center
- 2023-present Grant Writing I (ACR 5101, Spring: 1 credit)

 Department of Applied Clinical Research, UT Southwestern Medical Center
- 2023-present Introduction to Clinical Research (MPO 5230H, Spring, guest lecture on Research Ethics and Compliance)

 Master of Prosthetics-Orthotics Program, UT Southwestern Medical Center
- 2023-present Integumentary System Patient/Client Management (DPT 5138, Spring, guest lectures on Wound Interventions)

2020-present	Research Practicum (ACR 5094, Spring: 3 credits, Summer: 2 credits) Department of Applied Clinical Research, UT Southwestern Medical Center
2020-2020	Integumentary Physical Therapy (PT 4046/408, 2 credits) School of Physical Therapy, National Taiwan University
2014-2018	Applied Pathophysiology (PT636, 4 credits) Department of Physical Therapy, University of Illinois at Chicago
2015-2018	Instrumentation for rehabilitation sciences research (PT573, 3 credits) Department of Physical Therapy, University of Illinois at Chicago
2015	Science in Practice I (PT629, 3 credits) Department of Physical Therapy, University of Illinois at Chicago
2014	Research Methodology (HRS 2901, 3 credits) Department of Rehabilitation Science and Technology, University of Pittsburgh
2011	Rehabilitation Engineering Design (HRS 2703, 3 credits) Department of Rehabilitation Science and Technology, University of Pittsburgh

STUDENT ADVISING/MENTORING

Dissertation/Thesis Committee Chair/Mentor

Chris Pierson	PhD Dissertation (co-Mentor) 2023-present, UT Southwestern Medical Center		
Jan Petric	PhD Dissertation (Committee Chair) 2023-present, UT Southwestern Medical Center		
Tasha Champagne	PhD Dissertation 2023 (Mentor), UT Southwestern Medical Center Champagne was a Student Abstract Competition Finalist of the Capra Interdisciplinary Symposium		
Ophelie Puissegur	PhD Dissertation 2023 (Committee Chair), UT Southwestern Medical Center		
Rudri Purohit	MS Thesis 2019 (Committee Chair/Mentor), University of Illinois at Chicago		

Purohit received Poster Presenter Award at the WOCN 2019

conference

Varsha Rao MS Thesis 2017 (Committee Chair/Mentor), University of Illinois at

Chicago

Rao was awarded Best Student Scientific Paper at the NPIAP 2017

conference

Nkiru Unadike MS Project 2016, University of Illinois at Chicago

Dissertation/Thesis Committee Member

Andrew Nasr PhD Dissertation 2023-present, UT Southwestern Medical Center

Novelle Kew PhD Dissertation 2021, UT Southwestern Medical Center

Veronica Haywood PhD Dissertation 2019, University of Illinois at Chicago

Elizabeth Michalczyk PhD Dissertation, 2018, University of Illinois at Chicago

Saleh Alshammari MS Thesis, 2016, University of Illinois at Chicago

Rachelle Brick B.Phil Thesis, 2014, University of Pittsburgh

SERVICE TO PROFESSION

Peer-review Activities

- Journal Editorial Board
 - Frontiers in Physiology (Clinical and Translational Physiology)
- Ad hoc journal reviewer
 - Archives of Physical Medicine and Rehabilitation
 - Journal of Spinal Cord Medicine
 - o PLOS ONE
 - Medical Engineering & Physics
 - Assistive Technology
 - o Review of Scientific Instruments
 - o Journal of Wound Care
 - International Wound Journal
 - o Frontiers in Bioengineering and Biotechnology Production
 - o Nursing Open
- Grant reviewer
 - o Paralyzed Veterans of America Research Foundation (2019, 2021)
 - o US Department of Defense CDMRP PRMRP (2020, 2021)
- Ad hoc grant reviewer

- Physician's services incorporated foundation (2017)
- o US Department of Defense SCIRP (2019, 2021)

Professional Societies

2021-present Board of Director, National Pressure Injury Advisory Panel

- Standards Mission Committee co-chair
- Emerging leader task force chair
- Education Committee member
- 2016- 2018 American Congress of Rehabilitation Medicine, Spinal Cord Injury Interdisciplinary Special Interest Group
 - Secondary complication task force member
 - Women's health task force member
- 2016- 2016 Taiwan Physical Therapy Association, Collection of Rehabilitation Functional Assessment Tools task force member

OTHER PROFESSIONAL ACTIVITIES

- 2016 **Panel Moderator**, American Congress of Rehabilitation Medicine, Early Career Development Workshop
- 2014 **Mentee,** Association of Specialty Professor Workshop on Wound Repair and Healing in Older Adults, National Institute on Aging
- 2012 **Mentee,** Enhancing Rehabilitation Research in the South Grant Writing Workshop, National Institute of Health