

# DELANIE LYNCH

PhD

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## BIOMECHANICS

## PROFESSIONAL PROFILE

*Dr. Delanie Lynch* is a Scientist at Explico, supporting the biomechanics practice in applying forensic engineering principles to scientifically analyze injury mechanisms and accident dynamics.

*Dr. Lynch* earned her Ph.D. in Biomedical Engineering from the joint Virginia Tech-Wake Forest University School of Biomedical Engineering and Sciences, where she also completed her M.S. Her doctoral research focused on quantitative imaging and computational modeling of musculoskeletal health in older adults undergoing weight loss interventions. She applied medical image analysis, machine learning, and subject-specific finite element modeling to evaluate changes in muscle, fat, and bone. A key focus of her work was predicting fracture risk through change in bone strength across different intervention strategies, including diet alone, diet plus resistance training, and diet plus weighted vest use.

Prior to her doctoral work, *Dr. Lynch* conducted research at the Center for Injury Biomechanics, where her M.S. thesis assessed spinal disability risk from motor vehicle crashes and used medical imaging and morphometric analyses to examine thoracic shape variation.

Her passion for biomechanics during an undergraduate summer research program at East Carolina University, where she explored the use of imaging, simulations, and modeling to study injury risk. She holds a B.S. in Biomedical Engineering from Mercer University.

At Explico, *Dr. Lynch* is excited to begin her career in the field of biomechanics consulting. She is working toward professional engineering licensure and is committed to contributing to the growth of the team while delivering scientifically rigorous analysis in support of injury and accident investigations.

## EDUCATION

**Virginia Tech-Wake Forest University  
School of Biomedical Engineering and  
Sciences**

<b>PhD</b>	Biomedical Engineering	2025
<b>MS</b>	Biomedical Engineering	2022

**Mercer University School of Engineering**

<b>BS</b>	Biomedical Engineering	2020
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## AFFILIATIONS

SAE International  
International Women in Biomechanics (IWB)  
Orthopaedic Research Society (ORS)

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## AREAS OF EXPERTISE

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Biomechanics

## EXPERIENCE

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### Explico

2025 - Present

*Scientist*

### Wake Forest School of Medicine

2020 - 2025

*Graduate Research Associate*

### Mercer University

2019 - 2020

*Biomechanical and Gait Analysis Lab Assistant*

### East Carolina University

2019

*Performance Optimization Lab BME Intern*

## AWARDS AND HONORS

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**F31 Training Fellowship**, National Institute of Aging (NIA) *Award no. F31AG086010*, June 2025

**Early Career Investigator Travel Award**, 2024 Research Centers Collaborative Network Nutrition and Aging Biology Workshop, April 2024

**Trainee Poster Award and Travel Grant**, 2023 Wake Forest School of Medicine Center for Artificial Intelligence Colloquium, October 2023

**3rd Place Best Post Award**, 2023 Virginia Tech - Wake Forest School of Biomedical Engineering and Sciences Symposium, May 2023

**Best Poster Award MS Level**, 2021 Summer Biomechanics, Bioengineering and Biotransport Conference, June 2021

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## PROFESSIONAL SERVICE

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**Vice President**, Wake Forest Biomedical Engineering Society, 2021-2022

**Social Media/Outreach Committee Chair**, Wake Forest Biomedical Engineering Society, 2020-2022

**Friends-in-STEM Mentor**, Wake Downtown and The Science of Winston Salem, 2021-2023

**Mentor/Pen Pal**, Letters to a Pre-Scientist Pen Pal Program, 2020-2024

**Team Member**, Mercer on Mission Vietnam Program, 2018

## PEER-REVIEWED JOURNAL PUBLICATIONS

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Shea MK, Lynch SD, Brinkley TE, Kritchevsky SB. Nutrition and Aging Biology: Summary of a Research Centers Collaborative Network Workshop and Research Needs. *Current Developments in Nutrition*. May 2025.

Beavers KM, Lynch SD, Fanning J, Howard M, Lawrence E, Lenchik L, Shapses SA, Weaver AA, Wherry SJ, Zamora Z, Nicklas BJ, Beavers DP. Weighted Vest Use or Resistance Exercise to Offset Weight Loss-Associated Bone Loss in Older Adults: Primary Findings from the INVEST in Bone Health RCT. *The Journal of the American Medical Association (JAMA) Network Open*. May 2025.

Lynch SD, Howard M, Beavers DP, Lenchik L, Barnard R, Stapelton JR, Lawrence E, Cawthon PM, Hsu FC, Beavers KM, Weaver AA. Musculoskeletal Characteristics in Older Adults with Overweight or Obesity: INVEST in Bone Health Trial Baseline Analysis. *Obesity*. December 2024.

Hsieh KL, Beavers KM, Weaver AA, Lynch SD, Shaw IB, Kline PW. Real-World Data Capture of Daily Limb Loading Using Force-Sensing Insoles: Feasibility and Lessons Learned. *J. Biomech*. March 2024.

Stapleton JR, ARd JD, Beavers DP, Cogdill LS, Fernandez AZ, Howard MJ, Justice JN, Lynch SD, Newman JJ, Weaver AA, Beavers KM. Strategies to Reduce the Onset of Sleeve Gastrectomy Associated Bone Loss (STRONG BONES): Trial Design and Methods. *Contemp. Clin. Trials*. August 2023.

Beavers KM, Avery AE, Shankaran M, Evans WJ, Lynch SD, Dwyer c, Howard M, Beavers DP, Weaver AA, Lenchik L, Cawthon PM. Application of the D3Cr Muscle Mass Assessment Tool to a Geriatric Weight Loss Trial. *JCSM*. July 2023.

Lynch SD, Taylor SL, Green KA, Devane KS, Weaver AA. Characterizing Thoracic Morphology Variation to Develop Representative 3D Models for Applications in Chest Trauma. *Comput. Biol. Med*. June 2023.

Madrid DA, Knapp RA, Lynch SD, Clemens P, Weaver AA, Puwanant A. Associations between Lower Extremity Muscle Fat Fraction and Motor Performance in Myotonic Dystrophy Type 2: A Pilot Study. *Muscle and Nerve*. March 2023.

## PhD

Lynch SD, Weaver AA, Barnard RT, Kiani B, Stitzel JD, Zonfrillo MR. Age-Based Differences in the Disability of Spine Injuries in Pediatric and Adult Motor Vehicle Crash Occupants. *Traffic Injury Prevention*. June 2022.

Miller RM, Beavers DP, Cawthon PM, Crofts C, Fanning J, Gerosa J, Greene KA, Hsieh KL, Kiel J, Lawrence E, Lenchik L, Lynch SD, Nesbit BA, Nicklas BJ, Weaver AA, Beavers KM. Incorporating Nutrition, Vests, Education, and Strength Training (INVEST) in Bone Health: Trial Design and Methods. *Contemp. Clin. Trials*. May 2021.

## CONFERENCE POSTERS

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Lynch SD, Howard M, Beavers DP, Weaver AA, Lenchik L, Barnard RT, Beavers KM. Effect of Weighted Vest Use or Resistance Exercise During Caloric Restriction on CT-Derived Muscle and Fat Outcomes: Results from the INVEST in Bone Health RCT. [Poster Session]. 2025 International Conference on Falls and Sarcopenia. Toulouse, France.

Lynch SD, Barnard RT, Hsu FC, Lenchik L, Beavers KM, Weaver AA. Automated Analysis of CT Muscle Radiomic Features in Older Adults Living with Obesity [Poster Session]. 2024 American Society of Bone and Mineral Research Annual Meeting. Toronto, Canada.

Lynch SD, Howard M, Barnard RT, Beavers KM, Weaver AA. Evaluating Weight Loss-induced Changes in Muscle and Bone: A CT Analysis Of The INVEST In Bone Health Trial [Poster Session]. 2024 Orthopedic Research Society Annual Meeting, Long Beach, CA, United States.

Lynch SD, Barnard RT, Avery A, Dwyer C, Cawthon P, Howard M, Beavers KM, Weaver AA. Exploring Muscle Composition in the INVEST in Bone Health Trial: A Comparative CT Scan Study of Automated and Manual Methods [Poster Session]. 2023 Wake Forest School of Medicine Center for Artificial Intelligence Fall Colloquium. Winston-Salem, NC, United States.

Lynch SD, Howard M, Beavers DP, Lawrence E, Stapleton JR, Weaver AA, Beavers KM. Baseline Associations of Age and BMI with Compartmental, Volumetric Bone Mineral Density Tomography in Older Adults Living with Obesity in the INVEST in Bone Health Trial [Poster Session]. 2023 American Society of Bone and Mineral Research Annual Meeting. Vancouver, BC, Canada.

Lynch SD, Avery A, Dwyer C, Cawthon P, Howard M, Beavers KM, Weaver AA. Preliminary Analysis of Weight Loss Associated Musculoskeletal Changes as Assessed by Computed Tomography in the INVEST in Bone Health Trial. [Poster Session]. 2023 American Society of Bone and Mineral Research Annual Meeting. Vancouver, BC, Canada.

Lynch SD, Avery A, Dwyer C, Cawthon P, Howard M, Beavers KM, Weaver AA. INVESTigating Weight Loss Associated Change in Muscle and Bone Assessed by Computed Tomography [Poster Session]. 2023 Virginia Tech-Wake Forest School of Biomedical Engineering and Sciences Symposium. Roanoke, Virginia, United States.

Lynch SD, Taylor SL, Greene KA, Devane KS, Weaver AA. Development of 3D Models to Represent Thoracic Morphology Variation and Assist in Surgical Rib Fixation for Chest Trauma Patients [Poster and Pre-Recorded Lightning Talk]. 2022 Injury Biomechanics Symposium at Ohio State University. Virtual.

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Lynch SD, Taylor SL, Greene KA, Devane KS, Weaver AA. Development of 3D Models to Represent Thoracic Morphology Variation and Assist in Surgical Rib Fixation for Chest Trauma Patients [Poster Session]. 2022 Wake Forest Graduate School Research Day. Virtual.

Lynch SD, Weaver AA, Barnard RT, Stitzel JD, Zonfrillo MR. Disability Risk Associated with Motor Vehicle Crash Induced Spine Injuries Among Various Age Groups. [Poster Session]. 2021 Annual Biomedical Engineering Society Conference. Orlando, FL, United States.

Lynch SD, Green KA, Weaver AA. Characterizing and Modeling Pectus Excavatum Anatomy to Inform Surgical Planning and Device Design [Poster Session]. 2021 Summer Biomechanics, Bioengineering, and Biotransport Conference. Virtual.

Lynch SD, Green KA, Weaver AA. Biomechanical Evaluation and Subject-Specific Modeling of Pectus Excavatum Chest Wall Deformity for Surgical Planning and Device Design [Poster Session and Lightning Talk]. 2021 Virginia Tech-Wake Forest School of Biomedical Engineering and Sciences Symposium. Virtual.

Lynch SD, Green KA, Weaver AA. Mining, Measuring, and Modeling Pectus Chest Wall Anatomy [Poster Session]. 2020 Wake Forest Center for Biomedical Informatics Annual Colloquium. Virtual.

Lynch SD, Curran C, Domire ZJ. Effects of Parameter Manipulations on Speckle Tracking Algorithm Validity for Achilles Tendon Moment Arm Calculations [Poster Session]. 2019 Annual Biomedical Engineering Society Conference. Philadelphia, Pennsylvania. United States.