Concetta F. Morino

PhD, EI

Staff Consultant

Dr. Concetta Morino is a mechanical and biomedical engineer at Engineering Systems Inc. (ESi) in the North Carolina office. Dr. Morino has related expertise in mild to severe spinal injury, injury risk development, risk analysis, statistical analysis, injury detection, and biomechanical experimental testing (cadaver, anthropometric test device, and animal).

Prior to joining the team at ESi, Dr. Morino earned her Ph.D. in Mechanical Engineering and Materials Science and her M.S. in Biomedical Engineering from Duke University while conducting research in the Injury Biomechanics Laboratory. Her dissertation research focused on lumbar spine injury due to repeated loading, lumbar spine injury detection, and characterization of lumbar spine mechanical properties. She also has extensive research experience in a wide breadth of injury biomechanics topics, including mild traumatic brain injury (mTBI), behind armor blunt trauma (BABT), underbody blast (UBB), and diagnostic imaging.

Dr. Morino has presented her research at international conferences and is published in peer-reviewed scientific journals and conference proceedings, including Annals of Biomedical Engineering and International Research Council on Biomechanics of Injury.

Education

PhD, Mechanical Engineering and Materials Science. Duke University. 2024

MS, Biomedical Engineering. Duke University. 2024

BS, Mechanical Engineering. Ohio State University. 2019

Positions Held

Engineering Systems Inc., Charlotte, North Carolina

- Staff Consultant, 2024 – Present

Duke University, Durham, North Carolina

- Graduate Research Engineer, Injury Biomechanics Laboratory, 2019–2024

Contact Information

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Areas of Specialization

- Acute Spinal Injury
- Blast Biomechanics
- Chronic Spinal Injury
- Concussion/TBI
- Diagnostic Imaging
- Experimental Testing
- Failure Analysis
- Fatigue Loading
- High-Rate Loading
- Human Injury Analysis
- Impact Biomechanics
- Injury Causation
- Injury Mechanisms
- Material Property Characterization
- Statistical Analysis

Dynamix Engineering Ltd., Columbus, Ohio

- Mechanical Engineering Intern, 2018–2019

Johnson & Johnson's Ethicon Endo-surgery, Cincinnati, Ohio

- Robotics R&D Co-op, 2017

Professional Affiliations/Honors

Burroughs Wellcome Fund

- Fellowship

International Research Council on Biomechanics of Injury

- Best Presentation in Tissue Mechanics, 2023
- Travel Grant, 2023
- Best Presentation in Methodology, 2022
- Travel Grant, 2022

Injury Biomechanics Symposium

- Travel Grant, 2023
- Best Presentation Finalist, 2022
- Travel Grant, 2022

Biomedical Engineering Society (BMES)

- Conference Travel Grant, 2023
- BMES Member

World Congress of Biomechanics

- Pre-doctoral Award Semi-finalist, 2022

Relevant Course Work

- Anatomy and Physiology for Medical Physicists (Duke University)
- Biomechanics of Neurotrauma (Duke University)
- Biomedical Aspects of Blast and Ballistics (Duke University)
- Biomedical Microsystems (Duke University)
- Design in Mechanical Engineering (Ohio State University)
- Dynamics (Ohio State University)

- Engineering Principles of Cancer (Ohio State University)
- Experimental Design and Statistics (Duke University)
- Finite Element Method (Duke University)
- Fluid Mechanics (Ohio State University)
- Heat Transfer (Ohio State University)
- Intermediate Dynamics (Duke University)
- Machine Elements (Ohio State University)
- Measurements and Data Analysis (Ohio State University)
- Mechanics of Materials (Ohio State University)
- Musculoskeletal Biomechanics (Ohio State University)
- System Dynamics and Vibrations (Ohio State University)
- System Integration and Controls (Ohio State University)
- Thermodynamics (Ohio State University)
- Tissue Biomechanics (Duke University)

Publications

1. **Morino CF**, Dimbath E, Middleton ST, Kait JR, Luck JF, Bass CR. “High-resolution Computed Tomography (microCT) Technique for Capturing Soft Tissue Intervertebral Disc Changes After Repeated Loading.” *International Research Council on Biomechanics of Injury*, 2026 (in review).
2. **Morino CF**, Schmidt AL, Dimbath E, Middleton ST, Kait JR, Shridharani JK, Ortiz-Paparoni MA, Klinger J, Op ‘t Eynde J, Bass CR. “Human and Porcine Lumbar Endplate Injury Risk in Repeated Flexion-Compression.” *Annals of Biomedical Engineering*, 2024.
3. **Morino CF**, Middleton ST, Dimbath E, Op ‘t Eynde J, Kait JR, Luck JF, Bass CR. “Primary Creep Characterization in the Porcine Lumbar Spine Experiencing Combined Flexion and Compression Loading.” *Annals of Biomedical Engineering*, 2024.
4. **Morino CF**, Kait JR, Bass CR. “Hydration State Throughout Porcine Lumbar Intervertebral Discs: Comparing Fresh and Frozen-Thawed Specimens.” *Annals of Biomedical Engineering,* 2024.
5. **Morino CF.** “Lumbar Spine Behavior and Injury Due to Cyclic Loading.” Duke University, 2024.
6. Dimbath E, **Morino CF**, Middleton ST, Kait JR, Ortiz-Paparoni MA, Slotkin TA, Luck JF, Bass CR. “Cyclic Mechanism Affects Spinal Mechanical Response: A Study on Differences in Creep Response and Their Implications for Injury Risk.” *Annals of Biomedical Engineering*, 2024.

7. Ortiz-Paparoni MA, Op ‘t Eynde J, Eckersley CP, **Morino CF**, Abrams MZ, Pang DY, Kait JR, Pintar FA, Yoganandan N, Moore J, Barnes D, Loftis K, Bass CR. “Expanded Combined Loading Injury Criterion for the Human Lumbar Spine Under Dynamic Compression.” *Annals of Biomedical Engineering*, 2024.
8. Ortiz-Paparoni MA, **Morino CF**, Bercaw J, Op ‘t Eynde J, Nightingale R, Bass CR. “Translating Cadaveric Injury Risk to Dummy Injury Risk at Iso-energy.” *Annals of Biomedical Engineering*, 2023.
9. Ortiz-Paparoni MA, Op ‘t Eynde J, Kait JR, Bigler BR, Shridharani JK, Schmidt AL, Cox CA, **Morino CF**, Pintar FA, Yoganandan N, Moore J, Zhang J, Bass CR. “Human and Porcine Lumbar Endplate Injury Risk in Repeated Flexion Compression.” *International Research Council on Biomechanics of Injury*, 2023.
10. **Morino CF**, Middleton ST, Dimbath E, Op ’t Eynde J, Kait JR, Bass CR. “Primary Creep Characterization in the Porcine Lumbar Spine Experiencing Combined Flexion and Compression Loading.” *International Research Council on Biomechanics of Injury*, 2023.
11. Ortiz-Paparoni MA, **Morino CF**, Op ’t Eynde J, Kait JR, Bass CR. “Translating Cadaveric Injury Risk to Dummy Injury Risk at Iso-energy.” *International Research Council on Biomechanics of Injury*, 2022.
12. Ortiz-Paparoni MA, Op ’t Eynde J, Kait JR, Bigler BR, Shridharani JK, Schmidt AL, Cox CA, **Morino CF**, Pintar FA, Yoganandan N, Moore J, Zhang J, Bass CR. “The Human Lumbar Spine During High-Rate Under Seat Loading: A Combined Metric Injury Criteria.” *Annals of Biomedical Engineering*, 2021.

Presentations

1. **Morino CF**, Dimbath E, Middleton ST, Kait JR, Luck JF, Bass CR. “High-resolution Computed Tomography (microCT) Technique for Capturing Soft Tissue Intervertebral Disc Changes After Repeated Loading.” *International Research Council on Biomechanics of Injury*, Munich, Germany, September 9-11, 2026 (accepted for full conference presentation).
2. Sirhan K, **Morino CF**, Middleton ST, Dimbath E, Kait JR, Bass CR. “Unexpected Behaviour of Water in Lumbar Discs Under Repeated Flexion-Compression.” *International Research Council on Biomechanics of Injury*, Stockholm, Sweden, September 11–13, 2024.
3. Dimbath E, **Morino CF**, Middleton ST, Kait JR, Ortiz-Paparoni MA, Slotkin TA, Luck JF, Bass CR. “Analyzing Biomechanical Response Curves and How Statistics Expose Physiology.” *International Research Council on Biomechanics of Injury*, Stockholm, Sweden, September 11–13, 2024.
4. Middleton ST, **Morino CF**, Schmidt AL, Op ‘t Eynde J, Dimbath E, Shridharani JK, Ortiz-Paparoni MA, Klinger J, Luck JF, Bass CR. “Comparing Human and Porcine Lumbar Spinal Unit Primary Creep in Combined Loading with a Viscoelastic Model.” *Orthopaedic Research Society,* Long Beach, California, February 2-6, 2024.
5. **Morino CF**, Schmidt AL, Dimbath E, Middleton ST, Kait JR, Shridharani JK, Ortiz-Paparoni MA, Klinger J, Op‘t Eynde J, Bass CR. “Human and porcine lumbar endplate injury risk in repeated flexion-compression.” *Biomedical Engineering Society Annual Meeting*, Seattle, Washington, October 11-14, 2023.

6. Ortiz-Paparoni MA, Op ‘t Eynde J, **Morino CF**, Dimbath E, Bigler BR, Cox CA, Shridharani JK, Schmidt AL, Kait JR, Bass CR. “Effects of Flexion/Extension on the Axial Compression Tolerance of the Human Lumbar Spine During Dynamic Compression.” *Biomedical Engineering Society Annual Meeting*, Seattle, Washington, October 11-14, 2023.
7. Dimbath E, **Morino CF**, Middleton ST, Kait JR, Ortiz-Paparoni MA, Bass CR. “Role of Cyclic Loading in Porcine Lumbar Intervertebral Disc Behavior: A Preliminary Study.” *Biomedical Engineering Society Annual Meeting*, Seattle, Washington, October 11-14 2023.
8. Middleton ST, **Morino CF**, Dimbath E, Kait JR, Op ‘t Eynde J, Klinger J, Bass CR. “Quasilinear Viscoelastic Creep Model for Lumbar Soft Tissue Primary Creep Subject to Combined Loading.” *Biomedical Engineering Society Annual Meeting*, Seattle, Washington, October 11-14, 2023
9. **Morino CF**, Schmidt AL, Dimbath E, Middleton ST, Kait JR, Shridharani JK, Ortiz-Paparoni MA, Klinger J, Op‘t Eynde J, Bass CR. “Human and porcine lumbar endplate injury risk in repeated flexion-compression”. *International Research Council on Biomechanics of Injury*, Cambridge, England, September 13-15, 2023.
10. **Morino CF**, Middleton ST, Dimbath E, Op‘t Eynde J, Kait JR, Bass CR. “Modelling viscoelastic creep response of porcine lumbar spinal units exposed to repeated flexion-compression loading.” *International Research Council on Biomechanics of Injury*, Cambridge, England, September 13-15, 2023.
11. Dimbath E, **Morino CF**, Middleton ST, Kait JR, Bass CR. “Lumbar Response to Flexion-Compression in Cyclic and Quasi-static Loading in Intervertebral Discs.” *International Research Council on Biomechanics of Injury*, Cambridge, England, September 13-15, 2023.
12. **Morino CF**, Dimbath E, Middleton ST, Kait JR, Ortiz-Paparoni MA, Bentley TB, Shender BS, Bass CR. “Identifying Incipient Injury in Porcine Lumbar Intervertebral Disc from Prolonged Flexion-Compression Loading.” *Military Health System Research Symposium*, Kissimmee, Florida, August 14-17, 2023.
13. **Morino CF**, Dimbath E, Middleton ST, Kait J, Ortiz-Paparoni MA, Bass CR. “Identifying incipient injury from flexion-compression loading of porcine lumbar intervertebral disc.” *Ohio State Injury Biomechanics Symposium*, Columbus, Ohio, May 22-23, 2023.
14. Ortiz-Paparoni MA, **Morino CF**, Op ‘t Eynde J, Kait JR, Bass CR. “Translating Injury Metrics from Cadaver to Test Surrogate Using an Iso-energy Approach.” *International Research Council on Biomechanics of Injury*, Porto, Portugal, September 14-16, 2022.
15. Ortiz-Paparoni MA, **Morino CF**, Op ‘t Eynde J, Kait JR, Bass CR. “Translating Injury Metrics from Cadaver to Test Surrogate Using an Iso-energy Approach.” *World Congress of Biomechanics*, Taipei, Taiwan (virtual), July 10-14, 2022.
16. **Morino CF**, Ortiz-Paparoni MA, Op ‘t Eynde J, Kait JR, Abrams MA, Pintar FA, Yoganandan N, Moore J, Loftis KL, Barnes DR, Bass CR. “Expanded Combined Lumbar Injury Criterion Due to Underbody Blast.” *Ohio State Injury Biomechanics Symposium*, Columbus, Ohio, May 23-24, 2022.

17. Schmidt AL, **Morino CF**, Shridharani JK, Op ‘t Eynde J, Kait JR, Ortiz-Paparoni MA, Shender BS, Bentley TB, Bass CR. “Long-term lumbar spine loading flexion/compression injury and response.” *Military Health System Research Symposium*, Kissimmee FL, United States, September 12-16, 2022.
18. Op ‘t Eynde J, Pang DY, **Morino CF**, Abrams MZ, Kait JR, Salzar RS, Bentley TB, Shender BS, Bass CR. “The Severe Limitations of Clay for Assessing Human Response for Behind Armour Blunt Trauma.” *Military Health System Research Symposium*, Kissimmee FL, United States, September 12-16, 2022.