

CHLOE BARATTA

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SUMMARY

Biomedical Engineering Ph.D. candidate (graduating August 2026) with expertise in human subjects research (biomechanics and human factors), musculoskeletal modeling, and data science. Experienced in designing and executing experimental studies, developing computational pipelines, data analysis, and scientific communication. Passionate about solving complex technical problems that integrate experimental and computational methods.

EDUCATION

UNIVERSITY OF FLORIDA (UF)

Ph.D. in Biomedical Engineering

NIH NIAMS Predoctoral Individual National Research Service Award (F31 Fellowship)

M.S. in Biomedical Engineering

GPA: 3.92/4.0, UF Biomedical Engineering Graduate Student Preeminence Award

UNIVERSITY OF ILLINOIS AT CHICAGO (UIC)

B.S. in Biomedical Engineering with Minor in Disability and Human Development

GPA: 3.85/4.0; UIC College of Engineering Dean's Scholarship and Honors College Scholar

Gainesville, FL

Defended June 2026

December 2022

Chicago, IL

May 2020

TECHNICAL SKILLS

CODING

- **Python**
 - numpy, scipy, pandas
 - matplotlib, seaborn
 - scikit-learn, pytorch, tensorflow, keras
 - opensim API
- **MATLAB**
- **R**
- **C++** (basic)

MODELLING

- **OpenSim**
 - Model editing
 - Simulation
 - Kinematics
 - Dynamics
 - CMC
 - JRA
- **CAD/CAM**
 - Solidworks
 - Fusion 360
 - OnShape
- **EAGLE**
- **Blender**
- **LabVIEW**

PROTOTYPING

- **3D printing**
 - FDM
 - Polyjet
- **Milling**
 - CNC
 - PCB
- **Laser cutting**
- **Machining**
 - Turning
 - Grinding
 - Drilling
- **Embedded systems** (Arduino)

EXPERIMENTS

- **Motion capture**
 - Overground
 - Treadmill
- **Force sensors**
- **EMG**
 - Surface
 - Intramuscular
- **Biodex**
- **Eye tracking**
- **Ultrasound**
- **Metabolics**
- **Questionnaires**
 - Qualtrics
 - REDCap

PROCESSING

- **Vicon Nexus**
- **Cortex**
- **EMGworks**
- **Visual3D**
- **Pupil Core**
- **ImageJ**

EXPERIENCE

UF MUSCULOSKELETAL BIOMECHANICS LABORATORY

Graduate Research Assistant

Gainesville, FL

August 2020 – present

- PhD work:
 - Created and tested a first-of-its-kind musculoskeletal model with motion of the fibula in OpenSim
 - Designed and executed IRB-approved human-subject studies using motion capture, force plates and questionnaires
 - Collected experimental data during gait, functional, and athletic tasks from 20 healthy subjects across 2 studies
 - Developed subject-specific computational models for data-driven simulation of healthy and pathological ankle biomechanics
 - Created automated Python pipelines for data processing, model editing, simulations, statistical analysis, and data visualization
 - Validated computational model output against biplane fluoroscopy measurements (gold standard) using collaborator data
- MS work:
 - Tested the effect of a patented visual aid on accuracy and cognitive load during image interpretation of ankle x-rays
 - Collected and analyzed eye tracking and questionnaire data from 32 medical students, residents, and orthopaedic surgeons
- Mentored students (9 B.S., 2 M.S.) on projects ranging from limb dominance in yoga to machine learning for surgical navigation
 - Guided project design, supervised data collection, and taught data processing, analysis, simulation, and presentation prep
- Assisted with data collection for ~10 human subjects in upper-extremity studies using ultrasound-guided intramuscular EMG
- Designed and taught educational modules with hands-on EMG and ultrasound activities for community outreach events

US ARMY ENGINEER RESEARCH AND DEVELOPMENT CENTER

Intern – Information Technology Laboratory, Software Engineering and Evaluation Branch

Vicksburg, MS

July 2024 – January 2026

- Analyzed historical data for trends in occupational injury prevalence and impact
- Conducted technical assessment of injury prevention strategies supporting the Defense Logistics Agency
- Performed literature reviews and patent landscape analyses supporting modernization initiatives
- Designed simulation study using open-source biomechanics data and musculoskeletal modelling to simulate occupational injuries
- Planned an explainable AI framework to identify high-impact biomechanical predictors of injury through feature importance

UIC BIOMECHANICS AND CLINICAL OUTCOMES LABORATORY

Undergraduate Research Assistant

Chicago, IL

August 2019 – May 2020

- Assisted with collection of biomechanics, metabolics, and questionnaire data from 30 subjects with hip and knee osteoarthritis
- Processed data and analyzed whether gait characteristics and energy expenditure were correlated with fatigue and fatigability

UIC UR* LAB

Chicago, IL

CAD/Rapid Prototyping Lead (Senior Design)

August 2019 - May 2020

- Designed, prototyped, and performed ex vivo testing of a bladder irrigation device for hematuria to replace manual process
- Developed a novel retrograde flush mechanism and telemetric outflow monitoring for automated blockage detection and resolution
- Awarded UIC Chancellor's Translational Research Initiative Grant (\$25,000) for high commercialization potential

UIC COLLEGE OF ENGINEERING MAKERSPACE

Chicago, IL

Research/Scientific Aide

May 2018 – May 2020

- Assisted with CAD and CAM for student projects, operated and maintained rapid prototyping equipment, and oriented new staff
- Taught guest lectures and provided machine demonstrations for 75 students in additive/subtractive manufacturing classes

UNIVERSITY OF ILLINOIS HOSPITAL/UIC BIOMEDICAL ENGINEERING DEPARTMENT

Chicago, IL

Biomedical Engineer Intern (NIH-funded Clinical Immersion Program)

May 2018 – August 2018

- Conducted over 200 hours of clinical shadowing in Gastroenterology/Hepatology to conduct a user-centered needs assessment
- Collected quantitative data describing stress points and ergonomic threats and qualitative data through staff interviews
- Designed a functional prototype of a 3D-printed wearable airway protection device to replace human-performed “jaw thrust”

LEADERSHIP

UNIVERSITY OF FLORIDA AMERICAN SOCIETY OF BIOMECHANICS

Gainesville, FL

Secretary

August 2021 – May 2023

- Organized annual National Biomechanics Day events with hands-on activities for 80 students from Howard Bishop Middle School

AUTHORSHIP

CONFERENCE PRESENTATIONS

Baratta CE, Zermeno Salinas JL, Reb CW, and Nichols JA. “Evaluating Orthopaedic Surgeon Accuracy and Cognitive Effort when Assessing Center-Center Images for Ankle Syndesmosis Fixation.” Poster presented at the Orthopaedic Research Society Annual Meeting (national conference). February 4-8, 2022. Tampa, Florida.

Baratta CE, Zermeno Salinas JL, Baringer KD, Nichols JA and Reb CW. “Inclusion of a Visual Aid Improves Surgeon and Trainee Accuracy when Evaluating Images for Ankle Syndesmosis Repair.” Podium presented at the American Orthopaedic Foot and Ankle Society Winter Meeting (national conference). February 17-20, 2022. Phoenix, Arizona

Reb CW, **Baratta CE**, Zermeno Salinas JL, and Nichols JA. “Accurate Assessment of Tibiofibular Alignment and Mental Workload are Improved by Inclusion of a Visual Aid on Center-Center X-rays.” Podium presented at the American Academy of Orthopaedic Surgeons Annual Meeting (national conference). March 22-26, 2022. Chicago, Illinois

Baratta CE, Baringer KD, Reb CW, and Nichols JA. “Modelling Fibular Kinematics Using Skin Marker Motion Capture” Poster presented at the North American Congress on Biomechanics (international conference). August 21-25, 2022. Ottawa, Canada.

Baringer, KD, **Baratta CE**, Reb CW, and Nichols JA. “Comparing Kinematics of OpenSim Multi-Segment Foot Models During Low- and High-Demand Tasks.” Podium presentation at the 2022 BMES Annual Meeting (national conference). October 12-15, 2022. San Antonio, Texas.

Molina JE, **Baratta CE**, Zermeno Salinas JL, Reb CW, and Nichols JA (2025). “Analyzing Orthopaedic Surgeon Gaze Patterns during the Assessment of Syndesmosis Misalignment.” Poster presentation at the Orthopaedic Research Society Annual Meeting (national conference). February 7-11, 2025. Phoenix, Arizona.

Baratta CE, Reb CW, and Nichols JA (2025). “Measuring Fibular Kinematics with Marker-Driven Models in OpenSim.” Podium presentation at 20th International Symposium on Computer Simulation in Biomechanics (TGCS 2025) (international conference). July 23-25, 2025. Uppsala, Sweden.

Baratta CE, Reb CW, and Nichols JA (2025). “Simulating the Impact of Malreduction in Ankle Syndesmosis Repair on Fibula Kinematics.” Podium presentation at 30th Congress of the International Society of Biomechanics (ISB 2025) (international conference). July 27-31, 2025. Stockholm, Sweden.

LOCAL PRESENTATIONS

Baratta CE, Baringer KD, Reb CW, and Nichols JA. “Modelling Fibular Kinematics Using Skin Marker Motion Capture” Poster presented at UF J. Crayton Pruitt Family Department of Biomedical Engineering Pruitt Research Day (local). November 29, 2022. Gainesville, Florida.

Baratta CE, Baringer KD, Reb CW, and Nichols JA. “Measuring, Modeling, and Validating Kinematics of the Fibula in vivo.” Podium presentation at the University of Florida Biomechanics Discussion Group meeting. February 28, 2024. Gainesville, Florida.

Baratta CE, Reb CW, and Nichols JA. “Measuring Fibular Kinematics with Marker-Driven Models in OpenSim” Podium presentation at the University of Florida J. Crayton Pruitt Family Department of Biomedical Engineering Pruitt Graduate Research and Alumni Engagement Day. November 29, 2025. Gainesville, Florida.

PUBLICATIONS

Nichols JA, **Baratta CE**, and Reb CW. (2023). Biomechanical sequelae of syndesmosis injury and repair. *Foot and Ankle Clinics*, 28(1), 77-98.

Baratta CE, Zermeno Salinas JL, Baringer KD, Nichols JA, and Reb CW. (2022). Inclusion of a Visual Aid Improves Surgeon and Trainee Accuracy when Evaluating Images for Ankle Syndesmosis Repair. *Foot & Ankle Orthopaedics*, 7(2), 2473011421S00519.

Baratta CE, Zermeno Salinas JL, Vasilopoulos T, Reb CW, and Nichols JA. “Inclusion of a Visual Aid Improves Surgeon and Trainee Accuracy when Evaluating Images for Ankle Syndesmosis Repair.” Planned submission: *Clinical Orthopaedics and Related Research*.

Baratta CE, Cernucan KR, Peterson AC, Knutson K, Lenz AL, Reb CW, and Nichols JA. “Quantifying Healthy Fibular Motion: Marker-Driven Simulation of Syndesmosis Kinematics with in vivo Validation.” Planned submission: *Journal of Orthopaedic Research*.

Baratta CE, Reb CW, and Nichols JA. “Simulating the Kinematic Impact of Syndesmosis Malreduction.” Planned submission: *Journal of Biomechanics*.

Baratta CE, Reb CW, and Nichols JA. “Simulating the Kinetic Impact of Syndesmosis Malreduction.” Planned submission: *Journal of Biomechanics*.

AWARDS

UNDERGRADUATE

Scholarships

- UTC College of Engineering Dean’s Scholarship (2016-2020)
- University of Illinois at Chicago Honors College Scholar (2016-2020)

Honor Societies

- Tau Beta Pi
- Alpha Eta Mu Beta

Presentations

- 1st place: University of Illinois at Chicago 12th Annual Clinical Problems in Bioengineering Symposium (2018 Slide Slam)

Research Funding

- University of Illinois at Chicago Chancellor's Translational Research Initiative Award (2020)

GRADUATE

Fellowships

- University of Florida Biomedical Engineering Graduate Student Preeminence Award (2020-2025)
- NIH NIAMS Predoctoral Individual National Research Service Award (F31 Fellowship, 2023-2026)

Presentations

- 1st place, Graduate: University of Florida American Society of Biomechanics Three Minute Thesis Competition (2023)
- Best Oral Presentation: University of Florida J. Crayton Pruitt Family Department of Biomedical Engineering Pruitt Graduate Research and Alumni Engagement Day (2025)