REHABWEEK 2025

rehabweek Chicago '25

Category: Research

Workshop Title: OpenCap and AddBiomechanics: Tools for Large-Scale Biomechanics Studies

Organizer(s): Matthew Petrucci

Speaker(s): Bianco, Nicholas, Stanford University

Ong, Carmichael, Stanford University

Workshop Time: 08:15 - 09:45

Attendee Engagement: We will encourage and facilitate active participation throughout our workshop. Approximately 20 minutes of the workshop will be lecture content, 30 minutes will be focused on a demonstration of OpenCap, and 20 minutes will feature a hands-on exercise with AddBiomechanics. This will allow for an additional 20 minutes of Q&A for interaction and discussion. We will make use of example data and Google Colab notebooks so the audience can follow along during the demonstrations and hands-on exercises.

Abstract: Biomechanical measurements of movement can help predict and prevent injury, monitor disease progression, and inform clinical interventions. Traditionally, these measurements require expensive equipment and trained personnel to process, aggregate, and share these data, which limits access to these methods and studies to a small number of participants. Our team has created two new tools–OpenCap and AddBiomechanics–which have enabled hundreds of researchers to more quickly and easily collect, analyze, and share movement data. OpenCap (opencap.ai, Uhlrich et al., 2023) measures three-dimensional human movement using smartphone videos; AddBiomechanics (addbiomechanics.org, Werling et al., 2023) automatically processes motion capture files to generate a scaled musculoskeletal model and compute joint kinematics and kinetics. In this workshop, participants will learn how these new tools have been validated and how they expedite lab-based and out-of-lab studies of hundreds of participants, with applications to movement screening, injury prevention, and monitoring rehabilitation. Through a series of hands-on examples and demonstrations, workshop participants will learn how to incorporate OpenCap and AddBiomechanics in their research. The workshop will help participants build expertise in common workflows for simulation and biomechanical analysis and provide guidelines for obtaining high quality data.