Abstract
Robotic exoskeletons are external mechanical structures that share physical contact with the operator that allows a
direct or indirect transfer of mechanical power and information through passive and/or active actuation that is designed
to augment human performance. From 1962 to present, there have been well over 81,000 publications on the topic; of
which, roughly 75% have been done in the last 20 years. With over 50 years of research in this inherently
multidisciplinary field, there are many different approaches to engineering design. However, there are no published
guidelines specific to exoskeleton design and evaluation. The Quantitative Analysis of Non-Tested Universally Made
Exoskeleton Method, or QuANTUM Ex, approaches exoskeleton design and evaluation in a holistic and unifying way.
It provides an initial methodology specific to utilizing exoskeletons as a tool for training healthy individuals.

About the Speaker
Tom Schnieders is a Ph.D. candidate in the Department of Industrial and Manufacturing Systems Engineering at Iowa
State University. He received his master’s degree in human computer interaction and industrial engineering and his
bachelor’s degree in mechanical engineering and bioengineering from Iowa State University. Tom is interested in
designing, developing, and manufacturing exoskeletons, prosthesis, and orthoses, especially as a tool for learning and
for human augmentation. His research interests cover many domains including traditional ergonomics and human
factors, industrial engineering, bioengineering, biomechanics, mechanical engineering, biomedical engineering and
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and assessments, and robotics.