

RMCSR 2.0

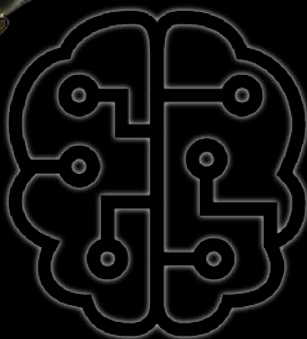
MOVING FORWARD

3 NEW RMCSR BOARD MEMBERS

New Executive Director
and Board Members for
a New Direction

ARTIFICIAL INTELLIGENCE

Advancing Movement Research
and Technology Development



ROCKY MOUNTAIN CONSORTIUM
FOR SPORTS RESEARCH

The Rocky Mountain Consortium for Sports Research (RMCSR) is a tax exempt (IRS code 501(c)(3)) charitable foundation dedicated to enhancing the performance, safety and long-term health of athletes through movement research and technology.

CONTENTS

MARCH NEWSLETTER, 2020

New RMCSR Executive Director

4

Michael Decker PhD takes over the reigns.

RMCSR 2.0: Moving Forward

5

Knowing where we are to move forward.

New RMCSR Board Members

6

Three scientists are appointed to the board.

Movement Tech with AI

8

Revolutionizing motion analysis to meet our mission.

RMCSR APPOINTS NEW EXECUTIVE DIRECTOR

The RMCSR is proud to announce that the Board of Directors voted unanimously to appoint co-founder and previous Director and Chief Scientific Officer Michael Decker, PhD to become the new Executive Director. He replaces co-founder Kim Gustafson and will serve as the main public contact and spokesperson for the RMCSR, represent the company and all professional business capacities, and manage all research and development activities.

Dr. Decker has directed his own scientific consulting company over the past decade and has designed and developed several orthopaedic devices, training and rehabilitation programs and state-of-the-art motion capture systems. He remains a Senior Research Consultant for the Mechanical and Materials Engineering Department at the University of Denver and his research interests have centered on translating movement research and technology to athletic populations.

He trained for nearly a decade at the world-famous Steadman Philippon Research Institute (formerly Steadman Hawkins Sports Medicine Foundation) in Vail, Colorado studying clinical biomechanics of the hip, knee and shoulder and maintains several collaborative relationships with his medical colleagues at the Mayo Clinic, CU Sports Medicine, Vail Summit Orthopaedics and Texas Scottish Rite Hospital for Children.

Dr. Decker was an instructor in the Integrative Physiology Department at the University of Colorado and has presented at numerous national and international meetings, published nearly 200 peer reviewed articles including manuscripts, abstracts and book chapters; and received awards for research, academic and teaching excellence.



Michael Decker, PhD, Executive Director of the RMCSR,

Dr. Decker's first order as the Executive Director of the RMCSR is to address the dire need for funding to continue the pursuit of it's mission. He has identified that the major obstacle of securing the long-term health of the Consortium has been the inability to involve and unite the athletic community under a common goal or objective.



"The first order of operation is to improve the messaging of how we plan to involve and unite the athletic community."

In the process of examining the current state of the Consortium, several important changes have already been completed. Most importantly, our mission statement has been broadened to include research performed across the lifespan. We believe that athletes, parents and the majority of youth sport clubs, in general, are not fully aware of the risks involved with sports participation and how these risks may influence long-term health and wellness.

RMCSR 2.0: MOVING FORWARD

Version 2.0 of the RMCSR begins with a deep dive of who we are and what we do. We are first and foremost centered on movement. Performance and injury risk are on the opposite ends of a movement quality continuum. Low movement quality is related to poor performance and high injury risk, whereas high movement quality is related to high performance and low injury risk. This core feature is translated throughout four main areas of research and development.

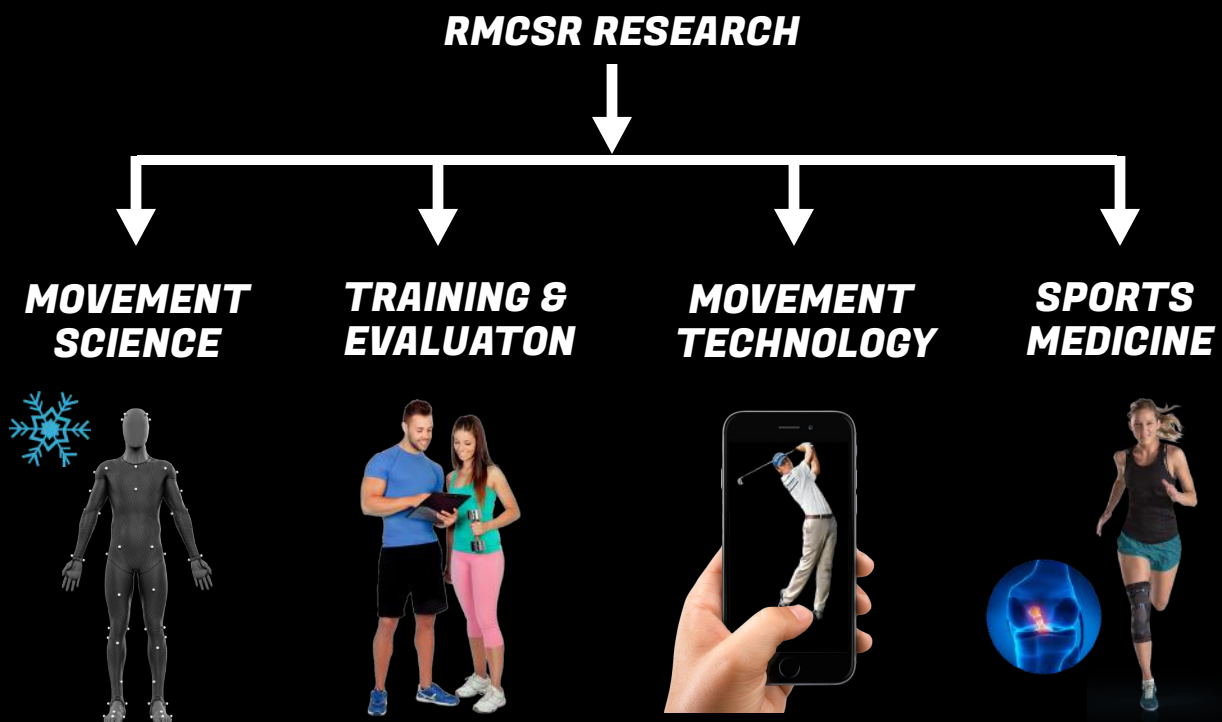
1) Movement Science. Basic movement science research is the foundation of determining the factors that influence body segment motions and how these motions are coordinated to maximize movement performance and safety.

2) Training and Evaluation. Applying the knowledge gained from movement science research to provide actionable insights for the improvement of movement quality.

3) Movement Technology. The design and development of accurate, field-based motion capture devices or systems that can rapidly evaluate movement quality during training, practice or competition.

4) Sports Medicine. The extension of movement science research to patient populations and the determination of how novel rehabilitation and training programs can enhance movement quality to improve performance and safety when the patient returns to competition, exercise or activities of daily life.

These four research and development emphases provide the necessary framework for any particular movement activity within sports, training, medical fitness and rehabilitation. In this light, the RMCSR has added four new board members to oversee the successful deployment of these research areas.



NEW RMCSR BOARD MEMBERS



TIMOTHY HEWETT, PHD

Dr. Hewett is a “pioneering researcher, expert team builder, and collaborative leader” as stated when he received an Endowed Professorship from Mayo Clinic. He has held multiple leadership positions, that include Director of the Sports Medicine Research Center, the Biomechanics Laboratories and the Materials and Structural Testing Core at Mayo Clinic. He also directed the Sports Health and Performance Institute at Ohio State University and was Professor and Director of Sports Medicine Research at Cincinnati Children’s Hospital and integral member of the Cardiovascular Institute. He has helped develop strong collaborative teams all over the world, including Australia and many institutions across the US. He has given many highly impactful Invited lectures, including Keynote addresses from Australia to the Arctic Circle, and grand rounds at Harvard, Stanford and Yale Universities. He has published over 400 peer-reviewed articles with 50,000+ citations and an H-index of 117. Dr. Hewett has had high levels of success in research funding from internationally competitive grants, from industry and other sources as demonstrated by his past funding support of \$20 million US. He has received numerous awards for “Paper of the Year” of multiple journals. Dr. Hewett has trained over 75 scientists, many of whom have gone onto major leadership roles at clinical research institutions.



MICHAEL TORRY, PHD

Dr. Torry is an Associate Professor in the Biomechanics Research Laboratory of Illinois State University. Prior to returning to Illinois State University, he was the Director of the Biomechanics Research Laboratory of the Steadman Hawkins Research Foundation from 1999-2010. Dr. Torry’s research has focused on the many aspects of clinical and applied human biomechanics including the dynamic performance of little league and major league baseball pitching, the EMG analysis of shoulder rehabilitation exercises, the evaluation of osteoarthritic gait, the benefits of functional knee bracing of athlete’s knees and the functional performance of ACL injured and reconstructed individuals. Dr. Torry’s work has led to numerous clinical and scientific awards that prompted his election to the prestigious National Academy of Science Keck Futures Initiative in 2007 and Society Representative for The US National Committee on Biomechanics. Dr. Torry’s work has been showcased on numerous media outlets including ESPN, The Today Show, MSNBC, The Discovery Channel and many others. He holds Adjunct Faculty positions at the University of Colorado in the Department of Kinesiology and Applied Physiology and in the Musculoskeletal Research Center in Department of Biomedical Engineering at the University of Pittsburgh; and is an Associate Editor for the Annals of Biomedical Engineering.



CRAIG SIMONS, PHD*

Craig Simons, PhD* is a mechanical engineer near the completion of his graduate work at the University of Denver. Mr. Simons specializes in predictive analytics (machine learning, artificial intelligence) and is proficient in the design and development of hardware and software applications pertaining to human movement. Mr. Simons has designed state-of-the-art motion capture systems using arrays of miniature wearable sensors and monocular computer vision-based 3D motion capture to measure movement performance in a wide range of settings and adverse weather conditions. He has been involved with the RMCSR since it's inception and will continue leading the development of patent pending technology for the RMCSR's "Muybridge Project."

In brief, Edward Muybridge (1830-1904) is recognized for his innovation in motion analysis by pioneering the equipment and techniques to photograph the movement of humans and animals (figure, left). The evolution of motion analysis is being led by the RMCSR and Mr. Simon's trail blazing work with artificial intelligence. His inventive work on a portable motion analysis system performed with a smart device or computer will enable the widespread use of performing diagnostic-grade measurements in applied settings (figure, right). This technology will transform users with a smart phone or video camera into a movement scientist that can screen, modify and enhance athletic performance ultimately promoting an individual's long-term health.

FIELD-BASED MOTION ANALYSIS THEN...



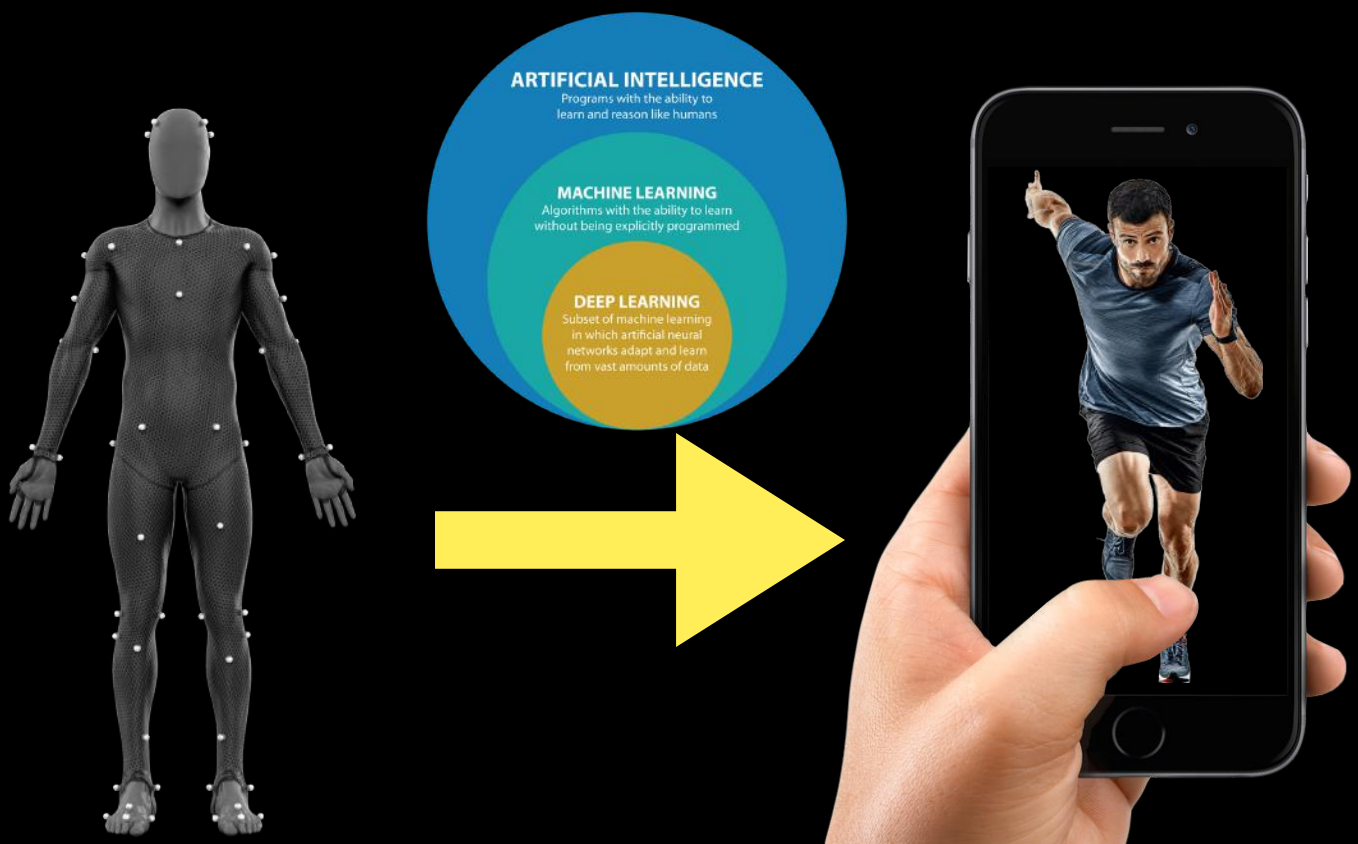
AND NOW....



MOVEMENT TECHNOLOGY USING ARTIFICIAL INTELLIGENCE

A standard motion capture laboratory consists of multiple cameras and movement experts that (typically) perform motion analyses with a large set of retro-reflective markers placed on the body (figure, bottom left). The test subject then performs a movement task and the motion analysis system records the three-dimensional (3D) marker trajectories and computes the motions of the performer's body segments. This method is extremely accurate, however, it requires a considerable amount of time, money and expertise ultimately limiting the availability and widespread use of motion analysis systems. More importantly, it can be argued that the measurements made in a controlled laboratory setting do not truly reflect the motions (and loads) that occur in competitive environments.

Given that an individual's movement quality influences injury risk and long-term health, the RMCSR set out to develop a simple, fast and accurate method of performing motion analyses anywhere movements are performed. Our approach is to use artificial intelligence to transform a smart device or video camera into a portable 3D motion analysis system. Our method of motion analysis (summarized on opposite page) does not require markers and can provide real-time measurements with diagnostic accuracy. This state-of-the-art motion analysis system will be revolutionary to sports, exercise and healthcare as movement quality assessments and screening procedures will become instantaneously affordable and accessible.



1

Movement images are captured with a video camera or device.



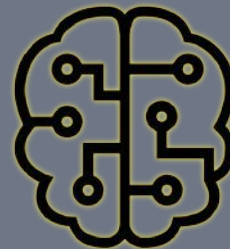
2

Computer vision technology is applied to images to extract body pose and a set of 2D keypoints.



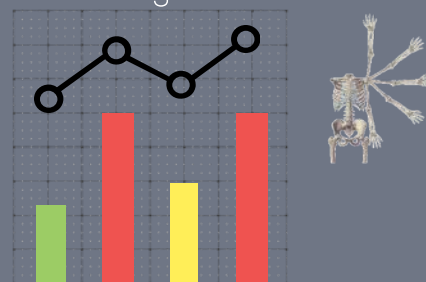
3

Proprietary machine learning algorithms are implemented to transform 2D data and compute 3D motions.



4

Data is displayed to provide actionable insights.



ROCKY MOUNTAIN CONSORTIUM
FOR SPORTS RESEARCH

Please support our mission by making a tax deductible donation at: www.rmcsr.org/donate

