Ryan S. Alcantara

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Education

Ph.D.	Integrative Physiology, University of Colorado Boulder	2021
M.S.	Integrative Physiology, University of Colorado Boulder	2019
B.S.	Applied Human Biology, Seattle Pacific University	2015

Research Experience

Postdoctoral

Wu Tsai Human Performance Alliance — 2021 – Present

Dr. Scott Delp, Bioengineering, Stanford University

Doctoral

Predicting Up- & Downhill Running Kinetics — 2020 – 2021

Dr. Alena Grabowski, Integrative Physiology, University of Colorado Boulder

- Developed neural network capable of predicting ground reaction force waveform from accelerometer data in near real-time across a range of running speeds and slopes.

Stress Fracture Risk Factors — 2017 – 2020

Drs. Alena Grabowski & Rodger Kram, Integrative Physiology, University of Colorado Boulder

- Monitored biomechanics and stress fracture prevalence of 30+ XC athletes over 3 years.
- Developed novel algorithms to predict running kinetics and kinematics from IMU data.

Curve Sprinting Mechanics — 2017 – 2020

Dr. Alena Grabowski, Integrative Physiology, University of Colorado Boulder

- Quantified leg-specific mechanics in sprinters across a range of track curve radii.
- Investigated collegiate and Paralympic sprinters with and without a lower leg amputation.

Masters

Leg Mass & Running Economy — 2017 – 2019

Dr. Alena Grabowski, Integrative Physiology, University of Colorado Boulder

- Quantified effect of increased running-specific prosthesis mass on metabolic power.

Industry

Running Footwear Biomechanics — 2015 – 2017

Brooks Running Company, Seattle, WA

- Tested novel footwear designs and their effect on running biomechanics.

Undergraduate

Stroller Running — 2014 – 2015

Dr. Cara Wall-Scheffler, Biology, Seattle Pacific University

- Identified the most metabolically economical method of running with a stroller.

Teaching Experience

Courses

Instructor, Human Anatomy Laboratory — Fall 2017 & Spring 2018

Integrative Physiology, University of Colorado Boulder

- Taught 4 sections of laboratory course of 10 – 15 junior and senior students.
- Guided students through anatomy of prosected human cadavers.
- 5.7/6.0 evaluation of overall performance and effectiveness in encouraging interest.

Undergraduate Teaching Assistant, Introductory Physics — Fall 2014 & Winter 2015

Prof. Matt Lautenschlager, Physics, Seattle Pacific University

- Assisted with in-class instruction and small group discussions of course material.
- Held regular office hours in Center for Learning.
- Completed training in contemporary STEM pedagogical methods.

Mentorship

Graduate Student Peer Mentoring Program — 2019 – 2021

University of Colorado Boulder

- Supported 2 graduate students during their first year.

"L2k" STEM Internship Program — 2019 – 2020

Legacy High School, Boulder, CO

- Facilitated a 20-hour internship that introduced STEM research and concepts to a local high school student.
- Resulted in local conference presentation.

Undergraduate Research Mentor — 2018 – 2020

Applied Biomechanics Lab, University of Colorado Boulder

- Trained students to independently collect and process biomechanical data.
- Taught introductory data visualization and statistical analysis with R and MATLAB.

Workshops

Version Control for Researchers

- University of Wisconsin-Milwaukee — 2020
- American Society of Biomechanics Annual Meeting — 2020

Grants & Fellowships

Latinx in Biomechanics Travel Grant, *The Biomechanics Initiative* — 2021

Eyes High Postdoctoral Fellowship ($50,000 CAD, Declined), *University of Calgary* — 2020

IPHY Department Travel Fellowship, *University of Colorado Boulder* — 2019

Diversity Travel Grant, *American Society of Biomechanics* — 2018

Graduate Student Travel Grant, *University of Colorado Boulder* — 2018

Graduate Dean's Fellowship, *University of Colorado Boulder* — 2017

Oregon Latino Scholarship, *Hispanic Metropolitan Chamber of Commerce* — 2012

President's Scholar Fellowship ($48,000), *Seattle Pacific University* — 2011 – 2015

Honors & Awards

World Athletics Award for Biomechanics (Finalist), *International Society of Biomechanics* 2021
Best Athletics Presentation, *International Society of Biomechanics in Sports* 2020
Best Masters Student Poster Presentation, *Rocky Mountain Regional ASB Meeting* 2018

Publications

Alcantara RS, Day EM, Hahn ME, Grabowski AM. 2021. Sacral acceleration can predict whole-body kinetics and stride kinematics across running speeds" *PeerJ.* 9:e11199 https://doi.org/10.7717/peerj.11199.

Alcantara RS, Edwards WB, Millet GY, Grabowski AM. 2021. Predicting continuous ground reaction forces from accelerometers during uphill and downhill running: A recurrent neural network solution. *bioRxiv* 2021.03.17.435901 https://doi.org/10.1101/2021.03.17.435901.

Day EM, **Alcantara RS**, McGeehan MA, Grabowski AM, Hahn ME. 2021. Low-pass filter cutoff frequency affects sacral-mounted inertial measurement unit estimations of peak vertical ground reaction forces and contact time during treadmill running. *Journal of Biomechanics* 119, 110323 https://doi.org/10.1016/j.jbiomech.2021.110323.

Alcantara RS. 2020. Prosthetic leg design, force production, and curve sprint performance: A pilot study. *International Society of Biomechanics in Sports Proceedings Archive* 38(1) https://commons.nmu.edu/isbs/vol38/iss1/230.

Alcantara RS, Beck OB, Grabowski AM. 2020. Added lower limb mass does not affect biomechanical asymmetry but increases metabolic power in runners with a unilateral transtibial amputation. *European Journal of Applied Physiology* 120, 1449-1456 https://doi.org/10.1007/s00421-020-04367-9.

Alcantara RS. 2019. Dryft: A Python and MATLAB package to correct drifting ground reaction force signals during treadmill running. *Journal of Open Source Software* 4(44), 1910 https://doi.org/10.21105/joss.01910.

Alcantara RS, Trudeau MB, Rohr ES. 2018. Calcaneus range of motion underestimated by markers on running shoe heel. *Gait & Posture* 63: 68-72 https://doi.org/10.1016/j.gaitpost.2018.04.035.

Alcantara RS & Wall-Scheffler CM. 2017. Stroller running: Energetic and kinematic changes across pushing methods. *PLoS* One 12(7): e0180575 https://doi.org/10.1371/journal.pone.0180575.

Conference Presentations

International

Alcantara RS, Edwards WB, Millet GY, Grabowski AM. 2021. Predicting continuous ground reaction forces from accelerometers during uphill and downhill running: A recurrent neural network solution. *International Society of Biomechanics.*

Alcantara RS. 2020. Prosthetic leg design, force production, and curve sprint performance: A pilot study. *International Society of Biomechanics in Sports.*

Alcantara RS, Day EM, Hahn ME, Grabowski AM. 2019. Sacral accelerations predict whole body kinetics and stride kinematics during running. *International Society of Biomechanics.*

National

Alcantara RS & Grabowski AM. 2021. Biomechanics of the inside and outside leg when sprinting along flat curves. *American Society of Biomechanics.*

Diaz G, **Alcantara RS**, Grabowski AM. 2021. Effects of curve radii on maximum curve sprinting velocity in athletes with a leg amputation. *American Society of Biomechanics.*

Alcantara RS & Grabowski AM. 2021. Increases in a runner's cumulative load precede metatarsal stress fracture: A case study. *American Society of Biomechanics.*

Alcantara RS & Grabowski AM. 2020. Loading asymmetry before and after metatarsal stress fracture: A case study. *American Society of Biomechanics.*

Alcantara RS. 2020. Curve sprinting with a split-toe running specific prosthesis: A pilot study. *American Society of Biomechanics.*

Alcantara RS, Beck OB, Grabowski AM. 2018. Mass added to a running-specific prosthesis increases metabolic power during running. *American Society of Biomechanics.*

Alcantara RS & Wall-Scheffler CM. 2016. Running with a stroller: Kinematic and energetic changes across different stroller pushing techniques. *American College of Sports Medicine.*

Regional

Alcantara RS & Grabowski AM. 2021. Biomechanics of the inside and outside leg when sprinting along flat curves. *Rocky Mountain ASB Meeting.*

Diaz G, **Alcantara RS,** Grabowski AM. 2021. Effects of curve radii on maximum curve sprinting velocity in athletes with a leg amputation. *Rocky Mountain ASB Meeting.*

Alcantara RS & Grabowski AM. 2020. Curve sprinting with a split-toe running specific prosthesis: A pilot study. *Rocky Mountain ASB Meeting (Accepted, cancelled).*

Alcantara RS, Day EM, Hahn ME, Grabowski AM. 2019. Sacral accelerations predict whole body kinetics and stride kinematics during running. *Rocky Mountain ASB Meeting.*

Alcantara RS, Beck OB, Grabowski AM. 2018. Mass added to a running-specific prosthesis increases metabolic power during running. *Rocky Mountain ASB Meeting.*

Alcantara RS, Trudeau MB, Brüggemann GP, Hamill J, Rohr ES. 2016. Running shoe forefoot bending stiffness affects calf muscle EMG. *Northwest ASB Meeting.*

Alcantara RS & Wall-Scheffler CM. 2015. Push it, push it real good: The energetic cost of running with a stroller. *Murdock College Science Research Program.*

Invited Presentations

Using accelerometers to measure a runner's biomechanics and monitor injury risk 2021
LIBM Seminar, Université Jean Monnet Saint-Etienne

Improving running performance and monitoring injury risk with wearable devices 2021
NMBL Seminar, Stanford University

Using inertial measurement units to predict running kinetics and kinematics 2019
LEOMO Inc., Boulder, CO

Wearable devices estimate biomechanical risk factors for stress fractures 2019
Integrative Physiology Colloquium, University of Colorado Boulder

Guest Lecturer, Introductory Biomechanics 2018
Colorado School of Mines, Golden, CO

Academic Service

Volunteering

Biomch-L Weekly Literature Updates, *International Society of Biomechanics* 2021 – Present

Colorado Advantage Program, *University of Colorado Boulder* 2019

National Biomechanics Day, *University of Colorado* 2018 – 2019

Committee Membership

Committee for Biomechanics Advocacy, American Society of Biomechanics 2017 – 2018

Conference Session Chairmanship

Sports Performance/Injury, *American Society of Biomechanics* 2021
Locomotion, *American Society of Biomechanics* 2020
Running Performance, *Footwear Biomechanics Symposium* 2019
Ph.D. Podium Competition, *American Society of Biomechanics* 2018
Sports, *Rocky Mountain ASB Regional Meeting* 2018

Journal Reviewing

Computer Methods in Biomechanics and Biomedical Engineering
Journal of Open-Source Software
Journal of Science and Medicine in Sport
British Journal of Sports Medicine
Gait & Posture

Specialized Skills

Laboratory: Vicon Nexus, Motion Analysis Cortex, Visual3D, OpenSim, Novel Pedar, Instron Material Testing, Delsys sEMG, Noraxon sEMG, IMeasureU, Parvo Medics, Oxycon Mobile, Biodex

Analysis: MATLAB, Python, R, Git, LaTeX

References

Dr. Scott Delp – James H. Clark Professor of Bioengineering, Stanford University
Dr. Alena Grabowski – Associate Professor, University of Colorado Boulder
Dr. Rodger Kram – Associate Professor Emeritus, University of Colorado Boulder