ALEXANDER TOLAS
Curriculum Vitae

CONTACT INFORMATION
Stanford University
Cardiovascular Medicine
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EDUCATION

2017-2021 Bachelor of Science in Kinesiology, Graduated 2021
Concentration: Exercise Science
California Polytechnic State University, San Luis Obispo, CA
Major GPA: 3.80
Cumulative GPA: 3.49
Honors Senior Project: Validation of a Multi-Sensor System for Objectively Detecting Sedentary Screen Time Among Adults.
Research Mentor: Sarah Keadle Ph.D., MPH

INTERESTS AND BACKGROUND:

My research focuses on the scalable measurement and validation of cardiorespiratory fitness and physical activity using wearable and mobile technologies. I am particularly interested in integrating physiological assessment, digital phenotyping, and epidemiologic modeling to improve cardiovascular risk stratification across diverse populations. My work spans device validation, predictive modeling, and translation of exercise physiology metrics into clinically meaningful digital health applications.

KEYWORDS: Digital health, wearable sensing, cardiorespiratory fitness, physical activity measurement, exercise physiology, cardiovascular epidemiology, behavioral interventions, health promotion, public health, precision health.

RESEARCH APPOINTMENTS

2021-current Clinical Research Coordinator, Ashley Lab, *Stanford University, Palo Alto, CA*

1. **ELITE Study (Wu Tsai Human Performance Alliance):**
   International collaboration investigating the genetic and physiological determinants of extreme cardiorespiratory fitness in elite endurance athletes (target VO2max ≥ 65 ml/kg/min in men; ≥ 55 ml/kg/min in women). Contributed to international recruitment and phenotyping of high-level endurance athletes. Supported collection, storage, and integration of genetic and performance data. Participated in validation of wearable-derived performance metrics against laboratory-based measures. Assisted with IRB compliance and international data governance procedures. Presented research findings at national and international conferences.

2. **My Heart Counts Cardiovascular Health Study (Apple/Google):**
   Smartphone-based digital health platform designed to assess mobile consent feasibility and real-time collection of sensor and survey data in a large ambulatory cohort (n >

25,000 participants). Contributed to development of prediction equations for digital 6-minute walk test (6MWT) distance using R. Performed data wrangling and statistical analyses of wearable and mobile-derived physiological metrics. Contributed to peer-reviewed publications in cardiovascular and digital health journals.

3. **Metabolic and Inflammatory Response to Exercise in Hypertrophic Cardiomyopathy:**
   Prospective study examining biomarker responses to exercise in individuals with obstructive hypertrophic cardiomyopathy. Managed study operations from initiation through closure, including development of research procedures across Stanford Medicine sites. Coordinated regulatory documentation and exercise testing workflows.

4. **SHaRe Study (Sarcomeric Human Cardiomyopathy Registry)**:
   Biorepository investigating cardiomyopathy genetics and associated health outcomes. Coordinated recruitment, enrollment, biospecimen handling, and EHR-based data abstraction. Maintained regulatory compliance and research documentation.

5. **PocketRN (Stanford Catalyst):**
   Health technology start-up focused on improving care transitions between home and healthcare settings. Coordinated research operations, recruitment, enrollment, and app-based adherence monitoring.

6. **ManageHF (NIA-Funded Randomized Trial):**
   Prospective randomized multi-center trial evaluating mobile just-in-time adaptive interventions (JITAIs) in heart failure (in collaboration with University of Michigan). Coordinated recruitment, enrollment, and adherence to study protocol and regulatory standards.

7. **Undiagnosed Diseases Network (NIH):**
   National precision medicine initiative supported by the National Institutes of Health. Developed electronic research databases for structured clinical data collection and supported patient enrollment and NIH application workflows.

2019-2021 Research Assistant, Keadle Lab, *Cal Poly, San Luis Obispo, CA*

1. **StandUPTV (CA239612):**
   Collaborated with Drs. Keadle and Buman on an NIH-funded project utilizing a MOST design to reduce sedentary screen time in adults with obesity or overweight. Developed procedures to guide participants through technology kit setup for assessing sedentary screen time. Managed participant enrollment, screening, data collection, and conducted study visits for 9 participants in a preliminary validation study. Drafted procedures and scripts for technical setup to be used in the MOST trial.

2. **DCEG Measurement Project (NIH/NCI):**
   This project aimed to implement a device-based measurement protocol to remotely collect activity and sleep data from US adults. I drafted the IRB, Informed Consent,

Study Manual of Procedures, and scripts/instructions for fellow researchers. I also programmed and built out REDCap for the study and coordinated with NCI/NIH, adhering to strict guidelines for study details and deadlines.

3. **ACT24 Project (# 75N91019C00001, NIH/NCI):**
   The purpose of this project was to validate a mobile platform for administering previous-day recalls of physical activity and sedentary behavior. This involved collecting direct observation data during a scheduled 3-hour period and coding videos using Noldus behavior observation software.

4. **Step Count Study Validation:**
   This project examined the accuracy of activity monitor step counts compared to direct observation. I developed R code to process and organize the data. As well, determine step count from direct observation as a criterion measure.

5. **NCI Behavior Coding Project:**
   The purpose of this project is to identify similarities and differences in direct observation coding methods among four different labs across the United States. This included coding videos using Noldus behavioral observation software. Through large-scale efforts, I worked as a team member finalizing coding protocol and adjudicating differences.

2020 Research Assistant, Biomechanics Lab, *Cal Poly, San Luis Obispo, CA*

1. **Knee Compressive Loads During Walking:**
   Under the guidance of Christie O'Hara and Dr. Scott Hazelwood, I designed a study to examine compressive loads and loading rate at the knee during the heel strike phase of walking under different footwear conditions. I quantified movement utilizing Cortex, MATLAB, and OpenSym. I managed and analyzed participant data.

PROFESSIONAL EXPERIENCE

2020-2021 Instructional Student Assistant
Cal Poly, San Luis Obispo, CA
- Grader for KINE 319 – Introduction to Research Methods in Kinesiology.

2019 Facility Supervisor
Cal Poly Associated Students, Inc.
- Managed Building Service Assistants, Membership Services, Pro Shop Staff, and Lifeguards.
- Served as a first responder and documented all injuries and incidents.

2018-2019 Poly Fit Member
Poly Fit, Cal Poly, San Luis Obispo, CA
- Conducted health/fitness assessments and provided individualized wellness feedback.

HONORS AND AWARDS

1. Honorable Mention for Fundamental Discovery - Poster Presentation, Wu Tsai Human Performance Alliance Symposium, 2023
2. FROST Summer Undergraduate Research Fellowship, 2019
3. Dean's List: 2018, 2019, 2020, 2021

PUBLICATIONS

Peer-Reviewed:

Mantena S, Johnson A, Oppezzo M, Schütz N, **Tolas A**, Doijad R, et al. Fine-tuning large language models in behavioral psychology for scalable health coaching. *npj Cardiovasc Health*. 2025;2(1):48. doi:10.1038/s44325-025-00083-5

Kim DS, Schütz N, Johnson A, **Tolas A**, et al. Unlocking insights: clinical associations from the largest 6-minute walk test collection via the MyHeart Counts Cardiovascular Health Study, a fully digital smartphone platform. *Prog Cardiovasc Dis*. 2025;89:45–52. doi:10.1016/j.pcad.2025.01.010

Keadle SK, Hasanaj K, Leonard-Corzo K, **Tolas A**, et al. StandUPTV: preparation and optimization phases of a mHealth intervention to reduce sedentary screen time in adults. *Contemp Clin Trials*. 2024;136:107402. doi:10.1016/j.cct.2023.107402

Javed A, Kim DS, Hershman SG, **Tolas A**, et al. Personalized digital behavior interventions increase short-term physical activity: a randomized controlled crossover trial substudy of the MyHeart Counts Cardiovascular Health Study. *Eur Heart J Digit Health*. 2023;4(5):411–419. doi:10.1093/ehjdh/ztad047

Keadle SK, Martinez J, Strath SJ, Sirard J, John D, Intille S, Arguello D, Amalbert-Birriel M, Barnett R, Thapa-Chhetry B, Cox M, Chase J, Dooley E, Marcotte R, **Tolas A**, Staudemayer JW. Evaluation of within- and between-site agreement for direct observation of physical behavior across four research groups. *J Meas Phys Behav*. 2023;6(3):176–184. doi:10.1123/jmpb.2022-0048

Yagi K, **Tolas A**, Barnett R, Keadle S. Comparing sleep pattern estimates of different monitor methods. *Med Sci Sports Exerc*. 2020;52(7 Suppl):403. doi:10.1249/01.mss.0000678220.83161.bc

Preprint:

Kim DS, Schütz N, Johnson A, **Tolas A**, et al. Data release and baseline analysis of the largest collection of 6-minute walk tests: the MyHeart Counts Cardiovascular Health Study, a fully digital smartphone platform. *medRxiv*. Published online June 27, 2024. doi:10.1101/2024.06.26.24309535

Manuscripts in Preparation:

Tolas A, Kim DS, Schütz N, Johnson A, Ashley E, et al. Reference equations for the 6-minute walk test derived from mobile devices. Manuscript in preparation.

Tolas A, Kim DS, Johnson A, Ashley E, , et al. Validation of maximal aerobic capacity estimates from activity monitors among high-level endurance athletes. Manuscript in preparation.

CONFERENCE PRESENTATIONS

Tolas A, Bourne B. ELITE: Exercise at the Limit – Inherited Traits of Endurance. 2023. *Western States 100 Endurance Run Research Program*, Lake Tahoe, CA.

Tolas A, Mattsson CM, Amar D, Moscarello T, Schnurr T, Bourne B, Johnson A, Lindholm ME, Ashley EA. Genetic determinants of elite endurance performance. 2023. *Wu Tsai Human Performance Alliance Research Symposium*, Palo Alto, CA.

Keadle SK, Christopher C, **Tolas A**, Patel S, Saint-Maurice PE, Matthews CE. Comparison of activity type and intensity estimates from the activPAL and video-recorded direct observation. 2022. *International Conference on Ambulatory Monitoring of Physical Activity and Movement (ICAMPAM)*.

Tolas A, Lyons R, Hasanaj K, Tran A, Popal L, Patel A, Buman M, Keadle S. Validation of a multi-sensor system to detect sedentary screen time in overweight/obese adults. 2021. *International Conference on Ambulatory Monitoring of Physical Activity and Movement (ICAMPAM)* [Virtual].

Tolas A, Jones MJ, Blake OH, Christie S, Hazelwood S. Different footwear knee biomechanics and loading rate. 2020. *American College of Sports Medicine Annual Meeting*, Newport Beach, CA [Virtual].

Yagi K, **Tolas A**, Barnett R, Keadle S. Comparing sleep pattern estimates from different monitor methods. 2023. *American College of Sports Medicine Annual Meeting*, San Francisco, CA [Virtual].

Tolas A, Jones M, Juett B, O'Hara C, Hazelwood S. Knee compressive force loading rates during heel strike. 2020. *KINE 409 Research Symposium*, California Polytechnic State University, San Luis Obispo, CA [Virtual].

Yagi K, **Tolas A**, Barnett R, Keadle S. Comparing sleep pattern estimates from different monitor methods. 2019. *Southwest American College of Sports Medicine Annual Meeting*, Newport Beach, CA [Virtual].

Yagi K, **Tolas A**, Barnett R, Keadle S. Comparing sleep pattern estimates from different monitor methods. 2019. *Cal Poly KPH FROST Research Symposium*, California Polytechnic State University, San Luis Obispo, CA.

CONFERENCES ATTENDED

1. Wu Tsai Research Symposium 2023
2. International Society for the Measurement of Physical Behavior, ICAMPAM – 2021
3. National American College of Sports Medicine - 2020
4. Southwest American College of Sports Medicine - 2019, 2020

TECHNICAL SKILLS

Statistical & Research Methods

- Multivariable linear regression and model diagnostics
- Linear mixed-effects models for hierarchical and repeated-measures data
- Model validation and agreement analyses (e.g., Bland–Altman methods)
- Cross-validation and predictive model assessment
- Correlation matrices and multicollinearity diagnostics
- Handling of missing data and cohort-level data cleaning workflows

- Validation of wearable-derived physiological metrics against criterion measures Real-world data (RWD) analysis in large digital health cohorts
- Research methods in Kinesiology and Public Health

Programming & Data Management

- R (i.e tidyverse, lme4, lmerTest, performance, arrow, corrplot)
- Reproducible statistical pipelines for large-scale Parquet datasets
- Data wrangling, feature engineering, and variable transformation
- REDCap database design and management
- Qualtrics survey design and branching logic
- Structured data export, harmonization, and quality control workflows

Digital Health & Physical Activity Measurement

- Smartphone-based cardiovascular data collection platforms
- Wearable sensor data processing (heart rate, pace)
- VO2max estimation algorithm evaluation
- Digital 6-Minute Walk Test (6MWT) implementation and validation
- Remote cohort recruitment and longitudinal follow-up in app-based studies

Cardiovascular & Exercise Physiology Assessment

- Cardiopulmonary Exercise Testing (CPET)
- VO2max laboratory assessment
- Functional performance testing (6MWT; field-based protocols)
- Cardiovascular risk and fitness phenotyping

Biomechanics & Motion Analysis

- Cortex (Motion Analysis Systems)
- Delsys surface EMG systems
- OpenSim musculoskeletal modeling
- Noldus Observer XT
- activPAL activity monitoring
- Actigraphy (Actigraph/Ametris)

Research Infrastructure & Governance

- Multi-site international study coordination
- IRB protocol development and amendment management
- GDPR-compliant data governance workflows
- Biospecimen logistics and global participant tracking

Design & Creative Tools

- Adobe Creative Suite
- Rhinoceros (CAD Software)