

Sung Eun Kim

Postdoctoral Scholar, Stanford University

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EDUCATION

03/01/14-02/26/18 **Ph.D.** Department of Sports Science Yonsei University, Korea
Biomechanical Effects of Ball Position on the Swing Variables of Elite Golfers
08/23/04-05/06/08 **B.S.** Warrington College of Business Administration University of Florida
Major: Finance

RESEARCH POSITIONS

08/16/22-Present **Stanford University** Department of Orthopaedic Surgery
Postdoctoral Scholar @ Ladd Lab, Motion & Gait Analysis Lab
1. Validate inertial measurement units (IMU) sensor data during the golf swing:
compared to the ground truth 3D motion capture system
2. Develop smartphone applications for sports: via computer vision (OpenCap) and
Artificial Intelligence - with the Department of Bioengineering, Stanford University
3. Develop a sonification tool: to improve golf swing tempo - with the Department of
Music, Stanford University
4. Project manager: oversee the weekly management of the projects of Medical
Students and Residents on Thumb Carpometacarpal (CMC) Osteoarthritis and
support the conceptualization and edit manuscript writing of those projects
5. Grant writing: support the National Institutes of Health grant writing on CMC
Osteoarthritis and write internal funding grants on understanding the
biomechanics of human movements
6. Support gait analysis: Elder activity level monitoring through structural vibrations
- the Department of Civil and Environmental Engineering, Stanford University
(granted by National Science Foundation)
03/01/21-08/15/22 **Yonsei University** Seoul, Korea
Researcher @ Frontier Research Institute of Convergence Sports Science
Researched biomechanical risk factors of golf swing-related knee injuries
01/14/19-02/14/20 **Descente Korea** Descente Innovation Studio Complex Busan, Korea
Research Engineer @ Human Performance Lab
Developed the first outsole design of spikeless golf shoes for Descente
Innovation Studio Complex (DISC)

JOURNAL PUBLICATIONS

[7] Validation of inertial measurement units for analyzing golf swing rotational biomechanics
Sung Eun Kim, Jayme Carolynn Burket Koltsov, Alexander Richards, Joanne Zhou, Kornél Schadl,
Amy Ladd, Jessica Rose. *Sensors*. 23(20), 8433, Oct. 2023.
[6] Golf swing in response to anteroposterior ball position
Sung Eun Kim, Jangyun Lee, Sae Yong Lee, Hae-Dong Lee, Sung-Cheol Lee, and Jae Kun Shim.
International Journal of Sports Science & Coaching. vol. 18, no. 5, Oct. 2023.

- [5] Potential biomechanical risk factors on developing lead knee osteoarthritis in the golf swing
Sung Eun Kim, Nicole S. Pham, Jae Hyeon Park, Amy Ladd, and Jangyun Lee. *Scientific Reports*.
 vol. 12, no. 22653, Dec. 2022.
- [4] Reducing knee joint load during a golf swing: the effects of ball position modification at address
Sung Eun Kim. *Journal of Sports Science and Medicine*. vol. 21, no. 3, pp. 393-400, Aug. 2022.
- [3] Small changes in ball position at address cause a chain effect in golf swing
Sung Eun Kim, Jangyun Lee, Sae Yong Lee, Hae-Dong Lee, Jae Kun Shim, and Sung-Cheol Lee.
Scientific Reports. vol. 11, no. 2694, Jan. 2021.
- [2] Biomechanical effects of ball position on address position variables of elite golfers
Sung Eun Kim, Young-Chul Koh, Joon-Haeng Cho, Sae Yong Lee, Hae-Dong Lee, and Sung-Cheol
 Lee. *Journal of Sports Science and Medicine*. vol. 17, no. 4, pp. 589-598, Dec. 2018.
- [1] Effect of golf club path to ball launch direction at impact
 Young Hoon Choi, Sung-Cheol Lee, and **Sung Eun Kim**. *The Korean Journal of Physical Education*,
 vol. 57, no. 5, pp. 407-415, Sep. 2018.

Manuscripts under review

Modeling Foot-Floor Interactions during Walking for Normal and Abnormal Gaits

Yiwen Dong, Yuyan Wu, **Sung Eun Kim**, Kornél Schadl, Jessica Rose, and Hae Young Noh

In-home Gait Abnormality Detection through Footstep-Induced Floor Vibration Sensing and Self-Supervised Contrastive Learning

Yiwen Dong, Yuyan Wu, **Sung Eun Kim**, Kornél Schadl, Peide Huang, Wenhao Ding, Jessica Rose, and Hae Young Noh

Stain use associated with increased flexor carpi radialis fraying and rupture in patients with thumb carpometacarpal arthritis

John B. Michaud, Paige Asbell, Faes D. Kerkhoff, **Sung Eun Kim**, Deborah Kenney, Amy L. Ladd

Potential biomechanical risk factors on lead knee ACL injuries in the golf swing

Sung Eun Kim, Amy Ladd, and Jangyun Lee

Manuscripts in progress

Biomechanical risk factors of the medial compartment knee osteoarthritis in golf swing

Sung Eun Kim, I Seul Cho, and Hae-Dong Lee

Electromyographic and kinematic analysis of golf putting: comparison between professional and amateur golfers

Jangyun Lee, Nicole S. Pham, **Sung Eun Kim**, Amy Ladd, Seong Ho Jang, and Jae Hyeon Park

CONFERENCE PUBLICATIONS

[8] Graphical Modeling of the Lower-Limb Joint Motion from the Dynamic Floor Responses under Footstep Forces – Best Paper awarded

Yiwen Dong, Jingxiao Liu, **Sung Eun Kim**, Kornél Schadl, Jessica Rose, and Hae Young Noh.

Proceedings of IMAC-XLII at the Society of Experimental Mechanics, USA, Jan. 2024.

[7] Validation of a Custom Wearable Inertial Measurement Unit (IMU) for Golf Biomechanical Analysis: Preliminary Results

Joanne Zhou, Jayme Carolynn Burket Koltsov, Alexander Richards, Kornel Schadl, **Sung Eun Kim** Amy Ladd, Jessica Rose. *41st Adrian E. Flatt Residents & Fellows Conference* at the Hand Society's 78th Annual Meeting, USA, Oct. 2023.

[6] Statins Linked to Tendon Fraying in Patients with CMC Arthritis

John B. Michaud, Paige Asbell, Faes D. Kerkhof, **Sung Eun Kim**, Deborah Kenney, Amy L. Ladd. *87th Annual Western Orthopaedic Association Meeting*, USA, Aug. 2023.

[5] Measurement of horizontal ground reaction force moment in the golf swing

Sung Eun Kim and Amy Ladd. *ISB 2023 Congress XXIX*. Fukuoka, Japan, Aug. 2023.

[4] Greater knee flexion is associated with higher loading of anterior cruciate ligament during the golf swing

Sung Eun Kim and Amy Ladd. *Proceedings of the 1st Wu Tsai Human Performance Alliance Research Symposium*. Stanford University, USA, Mar. 2023.

[3] Ground reaction force, pelvis and upper torso rotations in change of ball position along the mediolateral direction: effects on the club path

Sung Eun Kim and Sung-Cheol Lee. *The 7th Asian society of sport biomechanics conference* (ASSB), Korea, Oct. 2018.

[2] Pelvis and upper torso rotations in change of ball positions along the anteroposterior direction: effects on the club-head velocity

Sung Eun Kim and Sung-Cheol Lee. *The 30th International Sport Science Congress, The 56th KAHPERD Conference, The 99th National Sports Festival Commemoration*, In Commemoration of the 1988 Seoul Olympic Games, Korea, Oct. 2018.

[1] Effects of Inconsistent Ball Position on Address of the Elite Golfers

Sung Eun Kim, Young-Chul Koh, Joon-Haeng Cho, Sae Yong Lee, Hae-Dong Lee, and Sung-Cheol Lee. *The 25th International Sport Science Congress of Korean Society for History of Physical Education, Sports and Dance* (KAHPERD), Korea, Aug. 2013.

GRANTS

2021-2022	National Research Foundation of Korea (NRF)	Daejeon, Korea
	<i>Principal Investigator (PI)</i>	
	Biomechanical risk factors of the medial compartment knee osteoarthritis in golf swing	

AWARDS

2017-2018	Yonsei University Internal Scholarships	Seoul, Korea
2006	Dean's List	University of Florida
	Warrington College of Business	
2004-2008	4-consecutive SEC Academic Honor Roll	Southeastern Conference, USA
2004-2008	Full Athletic Scholarships	University of Florida Athletic Association

EXPERIENCES

2018-2019	Descente Korea	Seoul, Korea
	<i>Consultant</i>	
	Developed the first biomechanical golf apparel for Descente Korea	
2018-2019	Descente Sports Foundation	Seoul, Korea

	<i>Director</i>	
	Planned events to make sports activity fun at all population levels	
2004-2008	University of Florida <i>Women's Golf Team</i> Played NCAA Division 1 tournaments	Gainesville, FL

TEACHING

2023	Stanford University <i>Secondary Instructor</i> Ortho 199: Undergraduate Research	
2015-2019	Yonsei University <i>Lecturer</i> Sports Biomechanics, Golf, Teaching Methods in Golf 1, Teaching Methods in Golf 2, Physical Training	Seoul, Korea
2014-2019	Yonsei University <i>Teaching Assistant</i> Biomechanics 1, Sports Biomechanics 2, Seminar of Biomechanics 1 & 2, Advanced Biomechanics, Application of Computer in Physical Education, The Understanding of LabVIEW Programming	Seoul, Korea

LICENSE

2010-Now	Ladies Professional Golf Association (LPGA) <i>Class A LPGA Professional</i>	Daytona Beach, FL
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INVITED TALKS AND PRESENTATION

- [7] Stability retraining to improve the address posture and wrist consistency in golf putting
The Innovation and Discovery Expo, Stanford Bio-X and Wu Tsai Human Performance Alliance, Stanford University, Oct. 2023.
- [6] A novel algorithm detecting postural stability associated with hand and wrist precision and control in golf putting
The academic session for the R. Lane Smith visiting professor, Stanford University, April 2023.
- [5] Peak performance training methods to improve distance and accuracy in golf
The Korean Academy of Sports Science and Exercise Medicine Conference, Seoul, Korea, Aug. 2021.
- [4] Strategies to preparing for a biomechanist career
Sports biomechanics class course, Yonsei University, Seoul, Korea, Nov. 2020.
- [3] Development of products utilizing biomechanics
Sports biomechanics class course, Yonsei University, Seoul, Korea, Nov. 2020.
- [2] Golf swing mechanism
Descente Korea, Seoul, Korea, July 2018.
- [1] Success is a gift given when you embrace the future
Physical Education focus School Career Education Festival, Korea National Sport University, Seoul, Korea, June 2018.

PEDAGOGICAL TRAINING

2023	Statistical Parametric Mapping (SPM) Workshop, ISB 2023 Congress
2023	Preparing for a Faculty Career, Stanford University
2023	Essentials of Clinical Research, Stanford University
2022	Grant Writing Boot Camp, Stanford University
2016	SPSS Winter Camp, Yonsei University

SERVICE & OUTREACH

2023	Committee, the Nominate Women, International Women in Biomechanics
2023	Mentor, the Student-mentor Lunch, ISB conference (Fukuoka, Japan)
2023	Volunteer, the Digital Health Day, Stanford University
2012-2014	Translator and Instructor, LPGA Teacher Education Program

REVIEW EXPERIENCE

Journal of Sports Science & Medicine
Frontiers in Sports and Active Living
Heliyon

PATENTS

[2] Golf footwear prevented rotary and horizontal slippage ([R90](#), [Interview](#))

Sung Eun Kim and Jae Ik Lee, *Descente Korea*. 10-2344447, KR, Dec. 2021.

[1] Balancing golf apparel ([Utility](#), [Interview](#))

Sung Eun Kim, Seung Chul Hyun, and Ji Sun Bang, *Descente Korea*. 10-2300002, KR, Sep. 2021.

LANGUAGES

Korean (mother language), English (fluent)

PROGRAMMING

LabVIEW®, Visual3D®, MATLAB®

EQUIPMENT

3D Motion capture camera

Vicon®, Motion Analysis®

Force plate

AMTI®, Kistler®

Electromyography

Delsys®, Noraxon®

Computer vision

OpenCap

IMU sensor

Capture.U, 4D motion®

Novel

Pedar®, Loadsol®, Emed®

Foot scanner

INFOOT 3D scanner®

High-speed camera

Phantom®

Launch monitor

Trackman®, Flight Scope®

Last updated: January, 2024