Sarah Johnson

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EDUCATION

Imperial College London,
- Ph.D. in Bioengineering — Oct 2014 – Mar 2019
- M.Res. in Bioengineering, (Merit) — Oct 2013 – Sep 2014

University of Leicester,
- B.Sc.(Hons) in Biological Sciences, Cell physiology 2:1 (68.4%) — Sep 2010 – Jun 2013

Alleynes High School and 6th Form Centre,
- A Levels Maths, Chemistry, Biology, General Studies, Physics, (AAAAB) — Sep 2007 – Jun 2009
- GCSEs, (11 A*s) — Sep 2005 – Jun 2007

RESEARCH EXPERIENCE

Stanford University, California

- Post-doctoral researcher in the Digital Athlete Program under Prof Scott Delp.

Oct 2021 – present

Primary Projects
- Using data from wearables to address problems that limit human performance, with particular emphasis on injury prevention, hormonal health and translation through clinician, coach and athlete education.
- Developing an online tool to allow sharing, visualising and participant labelling of their own longitudinal training data.
- Using the labelled training data to develop biomechanically-informed loading metrics to identify injury risk patterns in real-time in runners.
- Investigating the impact of the menstrual cycle on cardiovascular response during exercise.
- Quantifying the impact of contraceptive use on cardiovascular response during exercise, symptom management and injury risk.

Collaborative projects
- Using our online platform to support the Return to Sport study, a collaboration including TRIA Orthopedics, The Canadian Sports Institute Pacific and the University of Oregon, measuring adherence to return-to-run protocols following stress fracture to inform clinical trials testing efficacy of a novel drug to speed bone healing.
- Collaboration with WHOOP to investigate how biometrics, behaviours and symptoms interact in menstruating women and those undergoing the menopausal transition.
- Collaboration monitoring physiological changes in an amateur triathlete receiving testosterone therapy.

The Alan Turing Institute Data Study Group, London

- Using machine-learning to improve vascular perfusion quantification in the critically ill. — Sep 2021

Dynamic Metrics, Hertfordshire

- Research within medical device start-up working on GaitSmart ™ — Jul 2019 – Aug 2021
  - Biomechanical modelling in OpenSim and data analysis in Python.
  - Database manipulation (MongoDB) and AWS command line use.
  - Software development (C++) to predict ground reaction force during gait measured with inertial measurement units.
  - Applying machine learning techniques (classification) to modelled patient gait to inform personalised rehabilitation.
  - Web design www.dynamicmetrics.com
- Internship as a researcher at Dynamic Metrics — Jan 2019 – Jul 2019

Imperial College London, London

- PhD Project: Modelling the effect of lymph node swelling on T cell response. — Oct 2014 – Jul 2019
  - Agent based modelling of T-cell response to antigen while varying lymph node swelling.
  - Implemented in Java, simulated using High Performance Computing, data analysis in Matlab.
  - Global sensitivity analysis with Latin Hypercube Sampling and calculation of Partial Rank Correlation Coefficients.
- PhD Project: Analysing inflammatory and miRNA expression changes in human lymphatic vessels associated with relapse in ovarian cancer patients. — Sep 2015 – Jul 2019
  - Isolation of micro-scale vessels and processing for RNA isolation or imaging.
  - Production of cDNA and subsequent real-time qPCR using 96 well plates.
  - Quantification of vessel inflammatory state and cancer-infiltration using immunohistochemical staining and imaging.
  - Analysis of miRNA expression data, imaging results and clinical patient data.
  - First author on an international collaboration with Texas A & M and Imperial College Healthcare NHS trust.
- Masters Project: Cell transport in murine lymph nodes using agent based models — Sep 2013 – Sep 2014
  - Assessed Modules: Computational Methods for Bioengineers, Statistics and Data Analysis

- Further Modules: Biomechanics, Computational Neuroscience, Techniques in Bioengineering.

University of Leicester, Leicester

- Summer Internship: Investigating the effect of 'NGEF' gene over-expression and RNAi silencing on neurodegeneration in Huntington gene-expressing cells — Jun 2013 – Sep 2013
- Undergraduate Project:'Identifying gene targets in Huntington's Disease using bioinformatic techniques to analyse data from model organisms and patients' — Jan 2013 – Jun 2013

AWARDS AND HONOURS

- The Wu Tsai Human Performance Symposium 2023. Most innovative short talk. Stanford — Mar 2023
- The Alan Turing Institute Sep 2021 Data Study Group: Drive Approach Award. London — Sep 2021
- Lymphatic Education & Research Network (LE&RN) Best Scientific Early Stage Researcher Poster Award. Lymphatics Forum. Chicago. — May 2017
- LE&RN Travel Award: NIH conference 'Lymphatics as Regulators...'. Washington DC. — Sep 2015
- Athletics Sports Scholar on the Developing Excellence Scheme at Imperial College London — Sep 2016
- British Universities Championships 10000m Silver Medallist. — May 2015
- Website Design, 2nd place, CodeFirst:Girls Html & CSS course at Imperial College London
  - https://johnsara04.github.io — Nov 2017
- The Anglo-Austrian Society Otto Harpner Award to fund German language course — Aug 2016
- 1st Year Academic Scholarship at the University of Leicester. — Oct 2012
- British U20 5000m England Athletics Gold Medallist. — Jul 2011

PRESENTATIONS AND PUBLICATIONS

- Decoding menstrual health across the lifespan: a scoping review on the use of digital health tools to improve women's health and performance. Johnson SC.*, Johanna O'Day *, Emily Kraus, Scott Delp, Jennifer Hicks. Preprint 2026 medrxiv.org/content/10.1101/2025.09.24.25336575v4
- The menstrual cycle through the lens of a wearable device: insights into physiology, sleep, and cycle variability. Gonzalez A, O'Day J, Johnson S, Kim J, Jasinski S, Holmes K, Delp S, Hicks J. Preprint 2025.doi.org/10.1101/2025.09.11.675620
- One year of testosterone therapy in a transmasculine amateur triathlete affects hormone cycles, exercise capacity, and muscular physiology. St. Pierre SR, Johnson SC, Muccini J, Bourne B, Laniakea BH, Delp S, Hicks J. Preprint 2025.doi.org/10.1101/2025.09.11.25335594
- Johnson SC, Gonzalez A*, O'Day J*, Hicks J, Delp S. Analysing the effect of menstrual state and contraceptive choices on performance and injury in runners. Presentation. 2025. Female Athlete Research Meeting. Stanford, CA.
- Johnson SC, Gonzalez A.*, O'Day J.*, Kuhl E, Hicks J, Delp S. Improving understanding of female runner health and performance with wearables: injury risk, training and menstrual health. (Presentation). 2025. American College of Sports Medicine Annual Conference, Atlanta, Georgia.
- O'Day J*, Gonzalez A*, Johnson S, Kim J, Jasinski S, Holmes K, Hicks J, Delp S. The menstrual cycle through the lens of a wearable device. (Presentation). 2025. Female Athlete Research Meeting. Stanford, CA.
- Johnson SC, Gonzalez A*, O'Day J*, Kuhl E, Hicks J, Delp S. How the menstrual cycle and contraceptive use affects the relationship between heart rate and running speed.(Presentation). 2025. Female Athlete Conference. Boston, MA.
- O'Day J*, Gonzalez A*, Johnson SC, Kim J, Jasinski S, Holmes K, Hicks J, Delp S. Characterization of cyclic physiology throughout the menstrual cycle and lifespan. (Presentation). 2024. Frontiers of Human Performance Meeting, Jackson Hole, WY, US.
- Johnson SC, Shetty M, Gonzalez A, O'Day J, Kuhl E, Hicks J, Delp S. Using smartwatch data to reduce injury and quantify menstrual cycle effects to improve performance. 2023. (Presentation). Wu Tsai Human Performance Symposium. Stanford.
- Johnson SC , Chakraborty S, Drosou A, Cunnea P, Tzovara D, Nixon K, Zawieja D C, Muthuchamy M, Fotopoulou C and Moore JE Jr. Inflammatory state of lymphatic vessels and miRNA profiles associated with relapse in ovarian cancer patients. 2020. PLOS ONE. doi.org/10.1371/journal.pone.0230092

- Johnson SC, Frattolin J, Edgar LT, Jafarnejad M , Moore JE Jr. Lymph node swelling combined with temporary effector T cell retention aids T cell response in a model of adaptive immunity.2021. Royal Society Interface. royalsocietypublishing.org/doi/10.1098/rsif.2021.0464
- Shou Y*, Johnson SC*, Quek YJ , Li X, Tay A. Integrative lymph node-mimicking models created with biomaterials and computational tools to study the immune system. 2022. Materials Today Bio.*(joint). doi.org/10.1016/j.mtbio.2022.100269
- Johnson SC, Edgar L, Watson D, Moore JE Jr.Hybrid agent-based/Transport modeling of immune cell interactions in lymph nodes. (Abstract) CMBBE. July 2019, New York, USA
- Johnson SC, Edgar LT, Moore JE Jr. Modelling the effects of Lymph Node hypertrophy on T cell transit and interactions during the cell mediated response. (Poster) BioMedEng2018. Sep 2018. London, UK.
- Johnson SC, Edgar L T, Moore JE Jr. Computational modelling of immune cell trafficking during inflammatory lymph node expansion. (Poster) Lymphatics Forum May 2017, Chicago, IL, USA.
- Johnson S, Moore JE Jr. MEIbioeng Sep 2016.(Poster) University of Oxford. UK. Agent Based modelling suggest lymph node enlargements aids T cell activation.

WORK, RESPONSIBILITIES AND TRANSLATION

Stanford University, California

- Biomech Course 281 - Mentor — Mar 2026
- Oakland Technical High School Panel: A panellist and guest speaker in ”Driven to Win: What No One Tells Female Athletes” — Nov 2025
- Science Small Groups (SSG) Mentor: A program for community college students aiming to close the gap in science training & opportunity — Sep 2023
- Summer Student Mentor for the Wu Tsai Undergraduate Program — Jul 2023
- Organizer of the All-Hands Meeting, Inaugural Wu Tsai Human Performance Symposium — Mar 2023

Imperial College London, London

- Sub-Warden at Beit Hall — Sep 2015 – Aug 2016
  - Pastoral care, budgeting and event planning in a hall of 400 students
- Global Innovation & Management Ambassador — Aug 2014 – Aug 2017
  - Annually organising cultural insight and team events for visiting Chinese students.
- Women’s Captain of Cross Country and Athletics — Sep 2015 – Aug 2016
- Imperial Festival Volunteer - science communication — May 2014 – May 2014

Riverview Residential Home, Health Centre assistant. Barlaston — Jan 2009 – May 2010

Centre de Salut, Health Centre assistant.Salango, Ecuador — Aug 2009 – Oct 2009

Oulton Abbey Care Home, Orderly. Oulton, Staffordshire — Oct 2008 – Mar 2010

OTHER

German B2 Imperial College London Horizons Program — Jun 2018

Imperial College High Performance Computing School Summer 2016 — Sep 2016

Linux/Unix at the Centre for Continued Professional Development Imperial College London — Nov 2015

Grade 7 Violin and Grade 6 Classical Guitar — Mar 2009

REFERENCES

- **Professor James E Moore Jr** , The Bagrit & RAEng Chair in Medical Device Design
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- **Professor Ruth Luthi-Carter** , Chair of Neurobiology of Behaviour
  MSB, University of Leicester, Leicester, LE1 7RH, UK
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