

David L. Carey

Curriculum Vitae

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Education

- 2015-2019 **Doctor of Philosophy**, *La Trobe University*.
Modelling training loads and injuries in Australian Football.
Research conducted with Essendon Football Club
- Injury risk modelling and training load optimisation.
 - Predictive models of player exertion ratings.
 - Analysis of multidimensional player monitoring data (GPS, heart rate, subjective wellness and physical screening).
- Supervisors: Prof. Meg Morris, Prof. Kay Crossley & A/Prof. Kok-Leong Ong.
- 2012-2013 **Master of Science**, *University of Melbourne*.
Mathematics and Statistics (Complex Systems research group)
Thesis: *Buckling Instabilities in Granular Media*
Supervisor: A/Prof. Antoinette Tordesillas
- 2009-2011 **Bachelor of Science**, *University of Melbourne*.
Major in Mathematical Physics
- 2003-2008 **Victorian Certificate of Education**, *Marcellin College*.

Experience

- 2019-present **Post-Doctoral Researcher**, *La Trobe University*.
- Computer vision applications in Australian Football
 - Player detection and tracking
 - Moving camera calibration
 - Deep learning
 - Integrating wearable sensor and computer vision data
 - Research conducted in partnership with Champion Data
- 2016-present **Lecturer/Tutor/Supervisor**, *La Trobe University*.
- Master of Sports Analytics
 - Master of Business Analytics (Data visualisation subject).
 - Subject coordination
 - Development and delivery of lectures and workshops using R and SAS Visual Analytics.
 - Development of assessment material.
 - Supervision of student research theses.
- 2015-present **Data analytics consultant**, *La Trobe University*.
- Essendon football club (EFC).
 - Consult on practises for data storage and analysis
 - Collaborate with EFC football and recruiting departments on data analytics projects.
 - Australian Institute of Sport (AIS).
 - Athlete performance forecasting (out-of-stadium performance trajectories project).
 - Delivered 3-day sports analytics intensive training to AIS staff

Technical Skills

Analysis tools	R, Python, Microsoft Excel	Numerical computing	R, MATLAB, Mathematica, C++, Fortran
Optimisation	FICO Xpress, Ipsolve, MATLAB	Data visualisation	ggplot, shiny, SAS Visual Analytics

Deep learning pyTorch

Computer vision openCV, pyTorch

Certifications

Coursera Machine Learning (Stanford)

edX Data Science and Machine Learning Essentials (Microsoft)

Coursera Managing Big Data with MySQL (Duke)

Publications

Ruddy JD, Pietsch S, Maniar N, Cormack SJ, Timmins RG, Williams MD, **Carey DL**, Opar DA (2019). *Session Availability as a Result of Prior Injury Impacts the Risk of Subsequent Non-contact Lower Limb Injury in Elite Male Australian Footballers*. *Frontiers in Physiology*.

Bourne MN, Bruder AM, Mentiplay BF, **Carey DL**, Patterson BE, Crossley KM (2019). *Eccentric knee flexor weakness in elite female footballers 1–10 years following anterior cruciate ligament reconstruction*. *Physical Therapy in Sport*.

Docking S, Rio E, Cook J, **Carey D**, Fortington L (2018). *Quantification of Achilles and patellar tendon structure on imaging does not enhance ability to predict self-reported symptoms beyond grey-scale ultrasound and previous history*. *Journal of Science and Medicine in Sport*.

Carey, D., Crossley, K., Whiteley, R., Mosler, A., Ong, K., Crow, J., & Morris, M. (2018). *Modelling Training Loads and Injuries: The Dangers of Discretization*. *Medicine and Science in Sports and Exercise*.

Carey, D., Ong, K., Whiteley, R., Crossley, K., Crow, J., & Morris, M. (2018). *Predictive modelling of training loads and injury in Australian football*. *International Journal of Computer Science in Sport*.

Carey, D., Crow, J., Ong, K., Blanch, P., Morris, M., Dascombe, B., & Crossley, K. (2017). *Optimising pre-season training loads in Australian football*. *International Journal of Sports Physiology and Performance*.

Carey, D., Blanch, P., Ong, K., Crossley, K., Crow, J. & Morris, M. (2016). *Training loads and injury risk in Australian football—differing acute: chronic workload ratios influence match injury risk*. *British Journal of Sports Medicine*.

Carey, D., Ong, K., Morris, M., Crow, J. & Crossley, K. (2016). *Predicting ratings of perceived exertion in Australian football players: methods for live estimation*. *International Journal of Computer Science in Sport*.

Tordesillas, A., **Carey, D.**, Croll, A. B., Shi, J., & Gurmessa, B. (2014). *Micromechanics of elastic buckling of a colloidal polymer layer on a soft substrate: experiment and theory*. *Granular Matter* (Vol. 16, p. 249-258).

Tordesillas, A., **Carey, D.**, & Shi, J. (2013). *Length scales from elastic buckling of a force chain under confined axial compression*. *AIP Conference Proceedings* (Vol. 1542, p. 605).

Croll, A. B., Tordesillas, A., **Carey, D.**, & Gurmessa, B. (2013). *Experimental evidence and structural mechanics analysis of force chain buckling at the microscale in a 2D polymeric granular layer*. *AIP Conference Proceedings* (Vol. 1542, p. 409).

Conference presentations

2019 *Optimizing Preseason Training Loads in Australian Football*. World Congress on Science and Football (Oral).

Modelling training loads and injury: Methodological issues and improved strategies. World Congress on Science and Football (Oral).

2018 *Modelling training loads and injury: Methodological issues and improved strategies*. Sports Medicine Australia (Oral). **Winner: ASICS Best Paper - Sport and Exercise Science**

2017 *Optimising pre-season training loads in Australian football*. New England Symposium on Statistics in Sport (Poster).

2016 *Acute:chronic workload ratio and injury risk in Australian football: A comparison of time windows and workload variables*. Sports Medicine Australia (Oral).

Prediction of athlete exertion ratings (RPE) using machine learning. ESSA Research to Practice (Poster).

2013 *Experimental Evidence and Structural Mechanics Analysis of Force Chain Buckling at the Microscale in a 2D Polymeric Granular Layer.* Powders and Grains (Poster).

Length Scales From Elastic Buckling Of A Force Chain Under Confined Axial Compression. Powders and Grains (Poster).

External Funding

2019 AIS - The Application of AI to Predict Strategy Outcomes and Strategy Proposals in Team Sports (\$173,000)

2019 Champion Data - New approaches to obtaining and analysing data on individual player movement in Australian football (\$100,000)

2015 Essendon Football Club (\$10,000)

Scholarships and awards

2018 Sports Medicine Australia Conference - Winner ASICS Best Paper - Sport and Exercise Science (\$2,000)

2015-2018 Australian Postgraduate Award (APA) PhD Scholarship (\$78,000)

2012-2013 University of Melbourne Department of Mathematics and Statistics scholarship (\$6000)

2007 Monash prize for academic achievement (\$1000)

Referees

Prof. Kay Crossley (LTU)

A/Prof. Kok-Leong Ong (LTU)

Prof. Meg Morris (LTU)

Justin Crow (EFC)

Stuart Morgan (AIS)