Yi-Chung Lin

yilin@acu.edu.au

https://www.linkedin.com/in/yi-chung-lin-ba1b7969/

CAREER OBJECTIVE

To integrate experimental data, computational modelling, and optimization to better understand human locomotion, to improve people's quality of life, and to help athletes improve performance and avoid injury.

EDUCATION

Ph.D. Mechanical and Aerospace Engineering, University of Florida, USA December 2008

M.S. Mechanical and Aerospace Engineering, University of Florida, USA August 2004

B.S. Mechanical Engineering, National Cheng Kung University, Taiwan September 1998

RESEARCH EXPERIENCE

Research Fellow

Sports Performance, Recovery, Injury & New Technologies (SPRINT) Research Centre, School of Behavioral and Health Sciences, Australian Catholic University, Victoria, Australia. April 2022-Present.

Processed and analyzed inertial measurement units (IMUs) and motion capture data collected from running on motorized and non-motorized treadmills. Developed MRI-informed musculoskeletal models to investigate architectural and biomechanical cause of hamstring strain injury during high-speed running.

Research Fellow

Computational Biomechanics Laboratory, Department of Mechanical Engineering, University of Melbourne, Victoria, Australia. December 2008-April 2022.

Developed and applied musculoskeletal modelling and optimization algorithms to study muscle and joint function during human locomotion, specifically, walking, running, and sprinting. Researched and developed methods to describe and explain the biomechanics of pathological gait and to understand biomechanical factors associated with joint disease. Integrated surrogate contact modelling with predictive algorithms to generate computationally-efficient, full-body dynamic simulations of human movement.

Research Assistant

Computational Biomechanics Laboratory, Department of Mechanical and Aerospace Engineering, University of Florida, Gainesville, Florida. August 2002-December 2008.

Developed and applied novel surrogate modelling approaches to produce rapid dynamic

optimization simulations of human motion with articular contact at joints such as the knee. Implemented multibody dynamic contact modelling techniques and surrogate modelling approaches to create a computationally efficient knee joint model for improving the ability to analyze new implant designs rapidly and to predict muscle forces across joints with improved reliability.

REFEREED JOURNAL PUBLICATIONS

P1. **Lin, Y.-C.**, and Pandy, M.G. (2022). Predictive simulations of human sprinting: effects of muscle-tendon properties on sprint performance. *Medicine & Science in Sports & Exercise* 54.

P2. Pandy, M.G. Lai, A., Schache1, A.G., and **Lin, Y.-C.**, (2021). How muscles maximize performance in accelerated sprinting. *Scandinavian Journal of Medicine & Science in Sports* 31.

P3. Thomeer, T.L., **Lin, Y.-C.**, Pandy, M.G. (2020). Load distribution at the patellofemoral joint during walking. *Annals of Biomedical Engineering* 12.

P4. Hainisch, R., Kranzl, A., **Lin, Y.-C.**, Pandy, M.G., Gfoehler, M. (2020). A generic musculoskeletal model of the juvenile lower limb for biomechanical analyses of gait. *Computer Methods in Biomechanics and Biomedical Engineering* 24.

P5. Karabulut, D., Dorgu, S.C., **Lin, Y.-C.**, Pandy, M.G., Herzog, W., and Arslan, Y.Z. (2020). Direct validation of model-predicted muscle forces in the cat hindlimb during locomotion. *Journal of Biomechanical Engineering* 142.

P6. **Lin, Y.-C.**, Walter, J.P., and Pandy, M.G. (2018). Predictive simulations of neuromuscular coordination and joint-contact loading in human gait. *Annals of Biomedical Engineering* 46, 1216-1227.

P7. Schache, A.G., **Lin, Y.-C.**, Crossley, K.M., and Pandy, M.G. (2018). Is running better than walking for reducing hip joint loads? *Medicine and Science in Sports and Exercise* 50, 2301-2310.

P8. Sritharan, P., **Lin, Y.-C.**, Richardson, S.E., Crossley, K.M., Birmingham, T. B., Pandy, M.G. (2018). Lower-limb muscle function during gait in varus mal-aligned osteoarthritis patients. *Journal of Orthopaedic Research* 36, 2157-2166.

P9. **Lin, Y.-C.**, and Pandy, M.G. (2017). Three-dimensional data-tracking dynamic optimization simulations of human locomotion generated by direct collocation. *Journal of Biomechanics* 59, 1-8.

P10. Crossley, K.M., Pandy, M.G., Majumdar, S., Smith, A.J., Agricola, R., Semciw, A.I., Kemp, J.L., Heerey, J.J., King, M.G., Lawrenson, P.R., **Lin, Y.-C.**, Souza, R.B, Mosler, A. B., Link, T.M., Srinivasan, R., Schache, A.G. (2017). Femoroacetabular impingement and hip OsteoaRthritis Cohort (FORCe): protocol for a prospective study. *Journal of*

Physiotherapy 64, 55.

P11. Lim, Y.P., **Lin, Y.-C.**, and Pandy, M.G. (2017). Effects of step length and frequency on lower-limb muscle function in human gait. *Journal of Biomechanics* 57, 1-7.

P12. Sritharan, P., **Lin, Y.-C.,** Richardson, S.E., Crossley, K.M., Birmingham, T.B., and Pandy, M.G. (2017). Musculoskeletal loading in the symptomatic and asymptomatic knees of middle-aged osteoarthritis patients. *Journal of Orthopaedic Research* 35, 321-330.

P13. Porsa, S., **Lin, Y.-C.**, and Pandy, M.G. (2016). Direct methods for predicting movement biomechanics based upon optimal control theory with implementation in OpenSim. *Annals of Biomedical Engineering* 44, 2542-2557.

P14. Lai, A., Schache1, A.G., Lichtwark, G.A., **Lin, Y.-C.**, Brown, N.A.T., and Pandy, M.G. (2015). In-vivo behavior of the human soleus muscle with increasing walking and running speeds. *Journal of Applied Physiology* 118 1266-1275.

P15. **Lin, Y.-C.**, Fok, L.A., Schache1, A.G., and Pandy, M.G. (2014). Muscle coordination of support, progression and balance during stair ambulation. *Journal of Biomechanics* 48, 340-347.

P16. Lai, A., Schache1, A.G., **Lin, Y.-C.**, and Pandy, M.G. (2014). Tendon elastic strain energy in the human ankle plantar-flexors and its role with increased running speed. *Journal of Experimental Biology* 217, 3159-3168.

P17. **Lin, Y.-C.**, Gfoehler, M., and Pandy, M.G. (2014). Quantitative evaluation of the major determinants of human gait. *Journal of Biomechanics* 47 1324-1331.

P18. Fok, L.A., Schache, A.G., Crossley, K.M., **Lin, Y.-C.,** and Pandy, M.G. (2013). Patellofemoral joint loading during stair ambulation in people with patellofemoral osteoarthritis. *Arthritis and Rheumatology* 65 2059-2069.

P19. Lim, Y.P., **Lin, Y.-C.**, and Pandy M.G. (2013). Muscle function during gait is invariant to age when walking speed is controlled. *Gait Posture* 38 253-259.

P20. Sritharan, P., **Lin, Y.-C.,** and Pandy, M.G. (2012). Muscles that do not cross the knee contribute to the knee adduction moment and tibiofemoral compartment loading during gait. *Journal of Orthopaedic Research* 30 1586-1595.

P21. Ackland, D.C., **Lin, Y.-C.**, and Pandy M.G. (2012). Sensitivity of model predictions of muscle function to changes in moment arms and muscle-tendon properties: a Monte-Carlo analysis. *Journal of Biomechanics* 45, 1463-1471.

P22. **Lin, Y.-C.,** Dorn, T.W., Schache, A.G., and Pandy, M.G. (2012). Comparison of different methods for estimating muscle forces in human movement. *Proceedings of the Institution of Mechanical Engineers, Part H, Journal of Engineering in Medicine* 226, 103-112.

P23. Dorn, T.W., **Lin, Y.-C.**, and Pandy M.G. (2012). Estimates of muscle function in human gait depend on how foot-ground contact is modeled. *Computer Methods in Biomechanics*

and Biomedical Engineering 15, 657-668.

P24. **Lin, Y.-C.**, Kim, H.-J., and Pandy, M.G. (2011). A computationally efficient method for assessing muscle function during human locomotion. *International Journal for Numerical Methods in Biomedical Engineering* 27, 436-449.

P25. Pandy, M.G., **Lin, Y.-C.**, and Kim, H.-J. (2010). Muscle coordination of mediolateral balance in normal walking. *Journal of Biomechanics* 43, 2055-2064

P26. **Lin, Y.-C.**, Haftka, R.T., Queipo, N.V., and Fregly, B.J. (2010). Surrogate articular contact models for computationally efficient multibody dynamic simulations. *Medical Engineering & Physics* 32, 584-594.

P27. **Lin, Y.-C.**, Walter, J.P., Banks, S.A., Pandy, M.G., and Fregly, B.J. (2010). Simultaneous prediction of muscle and contact forces in the knee during gait. *Journal of Biomechanics* 43, 945-952.

P28. **Lin, Y.-C.**, Haftka, R.T., Queipo, N.V., and Fregly, B.J. (2009). Two-dimensional surrogate contact modeling for computationally efficient dynamic simulation of total knee replacements. *Journal of Biomechanical Engineering* 131, 041010.

P29. **Lin, Y.-C.**, Farr, J., Carter, K., and Fregly, B.J. (2006). Response surface optimization for joint contact model evaluation. *Journal of Applied Biomechanics* 22, 120-130.

TEACHING EXPERIENCE

Lecturer

Department of Mechanical Engineering, University of Melbourne, Victoria, Australia.

- Mechanics and Materials – Mechanics (Undergraduate) Semester 1, 2012
- Mechanics 4 Unit 1 – Solid Mechanics (Undergraduate) Semester 1, 2011

Guest Lecturer

Department of Mechanical Engineering, University of Melbourne, Victoria, Australia.

- Computational Biomechanics (Postgraduate) Semester 2, 2021
  Semester 2, 2018
- Advanced Topics in Mechanical Engineering 2 – Rigid Body Modeling (Postgraduate) Semester 1, 2011

Department of Mechanical and Aerospace Engineering, University of Florida, Gainesville, Florida.

- Analytical Dynamics (Postgraduate) Fall 2008
- Introduction to Numerical Methods (Undergraduate) Spring 2008
- Introduction to Numerical Methods (Undergraduate) Fall 2007
- Analytical Dynamics (Postgraduate) Fall 2006

Teaching Assistant

Department of Mechanical and Aerospace Engineering, University of Florida, Gainesville, Florida.

- Introduction to Numerical Methods (Undergraduate) Spring 2006
- Engineering Mechanics – Statics (Undergraduate) Fall 2005
- Engineering Mechanics – Dynamics (Undergraduate) Summer 2005
- Introduction to Numerical Methods (Undergraduate) Spring 2005
- Experimental Optimum Engineering Design (Postgraduate) Fall 2004
- Engineering Mechanics – Dynamics (Undergraduate) Summer 2004
- Introduction to Numerical Methods (Undergraduate) Spring 2004
- Intermediate Engineering Analysis (Undergraduate) Fall 2003

HONORS AND AWARDS

- **Scandinavian Journal of Medicine and Science in Sports Paper of the Year** 2022
  Title: How muscles maximize performance in accelerated sprinting
- **Richard Skalak Best Paper Award** 2020
  Title: Direct validation of model-predicted muscle forces in the cat hindlimb during locomotion
- **Annals of Biomedical Engineering Editor's Choice Award** 2019
  Title: Predictive simulations of neuromuscular coordination and joint-contact loading in human gait
- **Early Career Researcher Grant** 2012
  Melbourne School of Engineering, University of Melbourne
- **Graduate Student Council Travel Grant** Summer 2007
  Graduate Student Council, University of Florida
- **Graduate Student Travel Grant** Summer 2007
  Office of Research and Graduate Programs, University of Florida
- **Outstanding International Student Award** Fall 2001
  International Center, University of Florida

COMPUTER EXPERIENCE

- **3D Modeling**: Geomagic, Rhinoceros, SliceOmatic, OpenSim
- **Engineering Software**: Pro/MECHANICA Motion, AutoCAD
- **Graphics and Designs**: Adobe Illustrator, Adobe Photoshop, Adobe ImageReady,
- **Programming Languages**: Matlab, Visual C++, Python, Autolev, SIMM

PROFESSIONAL ACTIVITIES

- **Guest Editor**

  Sensors. Special issue on "Human Movement Monitoring Using Wearable Sensor Technology" 2022-2023

  Life. Special issue on "Modelling and Simulation of Human Locomotion." 2021-2022

- **Selected Journal Reviewer** 2011-Present

  Annals of Biomedical Engineering
  Bone & Joint Research
  Computer Methods and Programs in Biomedicine
  Gait Posture
  IEEE Transactions on Neural Systems and Rehabilitation Engineering
  Journal of Biomechanics
  Journal of Orthopedic Research
  Journal of Sport and Health Science
  PLOS ONE
  Scientific Reports
  Sports Biomechanics