

KARAN TANEJA

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EDUCATION

University of California San Diego, San Diego, USA

Ph.D., Department of Structural Engineering

2018 - 2023

Micro-MBA, Rady School of Management

June - August 2022

TU Delft, Delft, The Netherlands

M.Sc., Structural Engineering

2015 - 2017

Delhi Technological University, New Delhi, India

B.Tech., Civil Engineering

2009 - 2013

RESEARCH INTERESTS

Computational Mechanics, Biomechanics, Physics-Informed Machine Learning.

WORK EXPERIENCE

University of Notre Dame, South Bend, USA

November 2023 - Present

Postdoctoral Research Associate

HP Inc., Palo Alto, USA

June - October 2023

Ph.D. Intern

MIDAS IT, Mumbai, India and Seongnam-Si, South Korea

June 2013 - September 2014

Technical Support Engineer

PUBLICATIONS

Taneja, K., Holland M., Saito, K., Kawasaki, H. (2025), *Astrocytes in White Matter respond to Tensile cues during Cortical Folding: a numerical study*. bioRxiv 2025.10.17.683172 (Preprint).

Taneja, K., He, X., Lee, C.H., Chen, J. S., Hodgson, J., Sinha, U., Sinha, S. (2025), *Investigating the Correlation between Force Generation and Intra-Muscular Pressure for Active Skeletal Muscle Contractions*. arXiv:2310.06191 (Preprint).

Taneja, K., He, X., He, Q., Chen, J. S. (2024), *A Multi-Resolution Physics-Informed Machine Learning Approach for Musculo-skeletal Digital Twin Applications*. Computational Mechanics,73(5), 1125-1145.

Taneja, K., He, X., He, Q., Zhao, X., Lin, YA, Loh, K., Chen, J. S. (2022), *A Feature-Encoded Physics-Informed Parameter Identification Neural Network for Musculo-Skeletal Systems*. Journal of Biomechanical Engineering, 144(12), 121006.

He, X., Taneja, K., Chen, J. S., Lee C. H., Hodgson, J., Malis, V., Sinha, U., Sinha, S. (2022), *Multiscale Modeling of Passive Material Influences on Deformation and Force Output of Skeletal Muscles*. International Journal for Numerical Methods in Biomedical Engineering, 38(4), e3571.

Reedlunn, B., Moutsanidis, G., Baek, J., Huang, T. H., Koester, J., He, X., ...Taneja, K., Bazilevs, Y. & Chen, J. S. (2020, June). *Initial Simulations of Empty Room Collapse and Reconsolidation at the Waste Isolation Pilot Plant*. In 54th US Rock Mechanics/Geomechanics Symposium. OnePetro.

Hoogenboom, P. C. J., Chenjie, Y., Taneja, K. (2016), *Moments due to Concentrated Loads on Thin Shell Structures*. Heron, 61(3), 153.

SEMINARS AND PRESENTATIONS

Taneja, K., Holland M., Saito, K., Kawasaki, H., (2025, June 22), *Deep folds in the brain result from cortex pulling on astrocytes: a numerical study*. Summer Bioengineering Conference, Santa Ana Pueblo, New Mexico, USA.

Taneja, K., Holland M., Saito, K., Kawasaki, H.,(2025, July 23), *An in silico study on the role of astrocytes in cortical folding*. 18th U.S. National Congress of Computational Mechanics (NCCM), Chicago, USA.

Taneja, K. (2025, March 3-7), *In silico modeling of biological tissues across length scales*. Young Investigators' Meeting, Agra, India.

Taneja, K. (2024, August 23), *Modeling biological tissues across length scales*. Mechanical Engineering Department, IISc Bangalore, India.

Taneja, K. (2024, August 7), *Modeling biological tissues across length scales*. Center for Biomedical Engineering, IIT Delhi, India.

Taneja, K., Holland, M. (2024, June 11-14), *A Numerical Study on the Effect of Cortical Diffusivity on Brain Tissue Gyration*. Summer Biomechanics, Bioengineering, and Biotransport Conference (SB3C), Lake Geneva, USA.

Taneja, K., He, X., He, Q., Chen, J. S., (2024, January 25), *Feature Encoded and Multi-Resolution Physics-Informed Machine Learning Approaches for Musculo-skeletal Digital Twin Applications*. Physics-informed machine learning meets engineering seminar series, The Alan Turing Institute, [Online Link](#).

Taneja, K., He, X., He, Q., Chen, J. S., (2023, July 25 - July 27), *Feature Encoded and Multi-Resolution Physics-Informed Machine Learning Approaches for Musculo-skeletal Digital Twin Applications*. 17th U.S. National Congress of Computational Mechanics (NCCM), Albuquerque, USA.

Taneja, K., He, X., He, Q., Chen, J. S., (2022, July 31 - August 5), *Physics-Informed Parameter Identification in Digital Twins of Human Musculo-Skeletal systems*. 15th World Conference on Computational Mechanics (WCCM), Yokohoma, Japan.

Taneja, K., He, X., Chen, J. S., (2021, September 26-29), *Physics-Informed System Identification in Digital Twins of Human Musculo-Skeletal systems*. Mechanistic Machine Learning and Digital Twins for Computational Science, Engineering & Technology - An IACM Conference (MMLDT-CSET), San Diego, USA.

Taneja, K., He, X., Chen, J. S., (2021, July 25-29). *System Identification in Digital Twins of Human Musculo-Skeletal Systems*. 16th U.S. National Congress of Computational Mechanics (NCCM), Chicago, USA.

Taneja, K., He, X., Chen, J. S., (2021, March 23-25). *System Identification in Digital Twins of Human Musculo-Skeletal Systems*. 5th Annual Workshop on Naval Applications of Machine Learning (NAML), San Diego, USA.

RESEARCH FELLOWSHIPS

Departmental Fellowship

- Jacobs School of Engineering, University of California San Diego for the Academic Year 2018-2019

SHORE Fellowship

- Division of Graduate Education and Postdoctoral Affairs, University of California San Diego for the Academic Years 2018-2023

TEACHING EXPERIENCE

Short Course Instructor

- 15th World Conference on Computational Mechanics, July 2022
Course Title: Machine Learning for Solid Mechanics

Student Mentor, NSF-Research Experience for Undergraduates, UC San Diego

- *Summer 2019*
Project: Using Image Segmentation techniques to create Computational Models of Calf Muscles.
- *Summer 2020, 2021*
Project: Using Machine Learning techniques to approximate the Failure Envelopes of Composites.
- *Summer 2022*
Project: Motion Prediction and Parameter Identification of Human Musculo-Skeletal system using Physics-Informed Machine Learning.

Teaching Assistant, Department of Mechanical and Aerospace Engineering, UC San Diego

- *Winter 2020, 2022, 2023*
Courses: MAE 232B, Finite Elements in Solid Mechanics II
- *Fall 2020, 2021, 2022*
Courses: MAE 232A, Finite Elements in Solid Mechanics I

ACADEMIC SERVICE

Journal Referee

- Journal for Biomechanical Engineering

Organizer

- College of Science and Engineering Research Horizons Symposium, University of Notre Dame (2024)
- Mechanistic Machine Learning and Digital Twins for Computational Science, Engineering & Technology - An IACM Conference (MMLDT-CSET), San Diego (2021)

PROGRAMMING AND SOFTWARE SKILLS

- Proficient in scientific Python, MATLAB and ABAQUS.
- Intermediate skills in FEBio, Ansys, TensorFlow, PyTorch, C++ and FORTRAN.

REFERENCES

- J. S. Chen (js-chen@ucsd.edu)
Professor, Dept. of Structural Engineering,
University of California, San Diego, USA.
- Maria Holland (maria-holland@nd.edu)
Associate Professor, College of Engineering,
University of Notre Dame, Notre Dame, USA.

- Shantanu Sinha (shsinha@health.ucsd.edu)
Professor, Dept. of Radiology,
University of California, San Diego, USA.
- Usha Sinha (usinha@sdsu.edu)
Professor, Dept. of Physics,
San Diego State University, San Diego, USA.