

# KARAN TANEJA

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## EDUCATION

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### University of California, San Diego, USA

Ph.D. Candidate, Department of Structural Engineering

2018 - Present

- Advisor: Prof. J. S. Chen

Micro-MBA, Rady School of Management

June - August 2022

### TU Delft, Delft, The Netherlands

M.Sc., Structural Engineering

2015-17

- Master's Thesis

- “*The Virtual Element Method - application to Linear and Gradient Elasticity problems*”;

with Prof. Bert Sluys and Prof. Angelo Simone

- Additional Master Thesis

- “*Moment under a point load in Thin Shell Structures - Optimization of Design Equation*”;

with Dr. Pierre J. Hoogenboom

### Delhi Technological University, New Delhi, India

B.Tech., Civil Engineering

2009-13

## RESEARCH INTERESTS

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Computational Mechanics and Bio-mechanics, Physics-Informed Machine Learning.

## PUBLICATIONS

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Taneja, K., He, X., He, Q., Chen, J. S. (2023), *A Multi-Resolution Physics-Informed Machine Learning Approach for Musculo-skeletal Digital Twin Applications*. <https://arxiv.org/abs/2305.16593>. (Accepted by Computational Mechanics)

Taneja, K., He, X., Chen, J. S., Hodgson, J., Sinha, U., Sinha, S., *Investigating the Correlation between Force Generation and Intra-Muscular Pressure for Active Skeletal Muscle Contractions*. (Submitted).

Taneja, K., He, X., He, Q., Zhao, X., Lin, Y.A., 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.

## PRESENTATIONS

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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*[Conference Session]. 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*[Conference Session]. Mechanistic Machine Learning and Digital Twins for Computational Science, Engineering Technology - An IACM Conference (MMLDT-CSET), San Diego.

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

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Departmental Fellowship

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

## TEACHING EXPERIENCE

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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

## WORK EXPERIENCE

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

*June 2013 - September 2014*

Technical Support Engineer

HP Inc., Palo Alto, USA

*June-October 2023*

Ph.D. Intern

## PROGRAMMING AND SOFTWARE SKILLS

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- Proficient in scientific Python, MATLAB and ABAQUS.
- Intermediate skills in Tensorflow, PyTorch, C++ and Fortran.

## REFERENCES

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- J. S. Chen (js-chen@ucsd.edu)  
Professor, Dept. of Structural Engineering,  
University of California, San Diego, USA.
- Qizhi He (qzhe@umn.edu)  
Assistant Professor, Dept. of Civil, Environmental, and Geo- Engineering,  
University of Minnesota, Twin Cities, USA.
- Shantanu Sinha (shsinha@health.ucsd.edu)  
Professor, Dept. of Radiology,  
University of California, San Diego, USA.