

# Aravind Jayasankar Ph.D.

**Material Science - Mechanical Engineering - Structural analysis - 3D printing**

**Address:** 42 Yunnan Crescent Singapore 638345

**Website:** [www.aravind.cc](http://www.aravind.cc) **Email:** [jaravindkumar88@gmail.com](mailto:jaravindkumar88@gmail.com) **Mobile:** +6581308554

Product design and development

Additive manufacturing

Data analysis

Mechanical design and engineering

Structural mechanics - ABAQUS

Python

Medical devices design

Research and development

Matlab

Parametric CAD modeling

Technical publishing

Mathematica

## Research experience

**Research fellow, HP-NTU Digital Manufacturing lab  
Nanyang Technological University, Singapore.**

**Sep 2019 - present**

- Product development of self assembling bio-medical devices.
- Structural modeling, design, thermal analysis and fabrication of 4D mechanisms using 3D printers.
- Design and performance evaluation of microneedle patch using finite element analysis.

**Ph.D. Researcher, Department of Biomaterials  
Max Planck Institute of Colloids & Interfaces (MPI) Germany.**

**Oct 2015 - Apr 2019**

- Structural analysis of Bio-inspired Tilings.
- Translation of biological samples into digital models
- Employed combination of parametric design techniques and Finite Element Analysis to evaluate their mechanical performance.
- Derivation of structural design rules for traslation into bioinspired structures.

## Visiting researcher

**Wyss Institute, Harvard University, Boston, USA.**

**Jul 2015-Oct 2015**

**Project:** Finite Element Modeling of 2D and 3D Tessellations.

Developed high-throughput, semi-automatic bioinspired CAD-based FE Models for mechanical analysis.

**AMOLF (Institute for molecular physics), Netherlands.**

**Mar 2017-Apr 2017**

**Project:** Computational structural mechanics and modeling.

Computational finite element modeling and creation of automatic evaluation of periodic bio-structures.

**Research assistant , Department of Engineering Science  
University of Auckland, New Zealand.**

**Jan 2014-Mar 2015**

**Project:** Design and Validation of Attachments for a Novel Knee Implant.

Developed fixators for orthopedic knee implants; bone growth and performance evaluated by FE analysis.

## Education

**Ph.D - Materials Science Grade: "Magna cum laude"** **2019**

**Technical University Berlin, Germany.**

Thesis topic: Structural analysis and modeling of bio-inspired tilings.

**Master's in Engineering - Engineering Science** **2015**

**University of Auckland, New Zealand.**

Thesis topic: Design and validation of prosthetic knee implants.

**Bachelor's in Engineering - Electronics and Instrumentation** **2009**

**Anna University, India.**

Thesis topic: Robotic prosthetic limb.

## Publications and Patents

**Jayasankar, A. K.,** Seidel, R., Hosny, J.C. Weaver, P. Fratzl, J. Chen, M.N. Dean (2020). "Multi-scale modeling and mechanical performance characterization of stingray skeleton-inspired tessellations." Journal of physics and mechanics of solids. Accepted.

**Jayasankar, A. K.,** Seidel, R., Naumann, J., Guiducci, L., Hosny, A., Fratzl, P., J.C.Weaver & Dean, M. N. (2017). "Mechanical behavior of idealized, stingray-skeleton-inspired tiled composites as a function of geometry and material properties". Journal of the mechanical behavior of biomedical materials, 73, 86-101.

Seidel, R., **Jayasankar, A. K.,** Shahar, R., & Dean, M. N. (2019). The Multiscale Architectures of Fish Bone and Tessellated Cartilage and Their Relation to Function. In *Architected Materials in Nature and Engineering* (pp. 329-353). Springer, Cham.

**Technical disclosure** for 3D printed 4D mechanism in medical devices for patent application: In progress

## Teaching Experience

Nanyang Technological University: Supervising final year project.

University of Auckland: Tutor "Introduction to Engineering Computation and Software" (MATLAB and C) and Teaching assistant for Biomechanics lab using Instron Machine and ABAQUS.

## Scholarships and grants

Travelling fellowship  
The Company of Biologists, United Kingdom

Department of Engineering Science scholarship  
University of Auckland, New Zealand

## Hobbies and Interests

PADI certified open water scuba diver

Drone enthusiast

Wildlife photographer and marine conservationist