

# Subin P George

## Indian Institute of Technology Madras (India)

G71A,IITM Capus, Chennai - 600036, Tamil Nadu, India

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### Education

Program	Institution/Board	%/CGPA	Year
<i>PhD</i> .(Spine Biomechanics)	Indian Institute of Technology Madras Chennai, Tamil Nadu	8.5/10	2024
<i>MS</i> (Engineering Design)	Indian Institute of Technology Madras Chennai, Tamil Nadu	9/10	2012
<i>B.Tech.</i> (Mechanical Engineering)	TKM College of Engineering kollam, Kerala	7.7/10	2007
<i>12th Stantard</i>	Good Shepherd Junior College Kottayam, Kerala	89.8%	2003
<i>10th Stantard</i>	Good Shepherd Public School Kottayam, Kerala	89.8%	2001

### Key Projects

- 1. Non Linear Finite Element Simulation of morphological lumbosacral model** July 2019 - Aug 2024  
(PhD / Guide: Prof. G Saravana Kumar ,IITM) IIT Madras
  - Developed a hexahedral finite element Lumbar model and validated it with experimental results
  - Sensitivity analysis of anthropometric parameters to kinematic output.
  - Keywords: Mesh morphing,verterbal fusion,Disc compression, non-linear explicit simulation
- 2. Robotic mobilizer for paraplegic patients** 2019-2023  
(Nirmaan Pre Incubation ,IITM) IIT Madras
  - Developed a sit-stand mobility equipment for mobilizing spinal cord injured(2 design patents filed)
  - Keywords:Lower limbs, assistive technology, paraplegic,Linkage synthesis
- 3. Design and analysis of subject specific femoral implants** 2009-2012  
(MS/ Guide: Prof G Saravana Kumar,IITM) IIT Madras
  - Developed a custom hip implant based on patient morphology
  - Keywords: Abaqus,Optimization,Porous Additive manufacturing,Stress Shielding,Medical image processing

### Work Experience

- Research Assistantship** under Dr. G. Saravana Kumar, Professor, IIT Madras Aug 2009 to Aug 2012
  - Teaching Assistant (TA) for Dual Degree Students of Engineering Design
- Developer** at General Motors, Bangalore Sep 2012 to Jun 2013
  - Worked on building custom CAD applications through programming
- Assistant Professor** at Amal Jyothi College of Engineering, Kanjirappally, Kerala Dec 2013 to Jul 2019
  - Delivered lectures in Design-related subjects including Computer-Aided Design and Analysis, Advanced Mechanics of Solids, Advanced Theory of Mechanisms
  - Mentored Design Projects for UG & PG students
  - Principal investigator for State & Central Government funded RD Projects
  - Conducted workshops on Finite Element Analysis using Abaqus CAE
  - Actively involved in DST funded Startup ecosystem in the College
  - Delivered motivational talks to boost entrepreneurship among students

### Course Work

#### Key Courses

(Core and electives for MS & PhD)

IIT Madras

- o Course: Constitutive modelling in continuum mechanics,Advanced Solid Mechanics,Optimization methods in Engineering design,Biomechanics,Medical image processing,Finite Element Analysis

## Technical Skills

- o **Programming Language:** C, C++,Python,Matlab
- o **Modeling & FE Analysis:** Abaqus, LS Dyna, Autodesk Inventor,ANSA Pre Processor

## Publications in Conferences and Journals

1. S. P. George, K. Venkatesh, and G. Saravana Kumar, "Development, calibration and validation of a comprehensive customizable lumbar spine FE model for simulating fusion constructs," Med Eng Phys, vol. 118, no. March, p. 104016, 2023. [DOI]
2. S. P. George, K. Venkatesh, and G. Saravana Kumar, "Nonlinear calibration of a lumbar motion unit using a morphing approach," 20th Int Conf on Exp Mechanics, Porto Portugal, 2023. [PDF]
3. Subin P George, and Saravana Kumar G., "Patient-specific parametric geometric modeling and finite element analysis of cement less hip prosthesis," Virtual and Physical Prototyping, Vol. 8, No. 1, 2013, pp. 65-83. [DOI]
4. Subin P George, and Saravana Kumar G., "Optimization of custom cement-less stem using finite element analysis and elastic modulus distribution for reducing stress-shielding effect," Proc IMechE Part H: J Engineering in Medicine, Vol 231, Issue 2, 2017, pp. 1–11. [DOI]
5. First prize for "PROF GD SUNDARARAJ BEST PAPER SESSION" at CMC Vellore Spine CME & Prof GD Sundararaj Oration 2022 at Vellore, Tamil Nadu, India for the paper titled "A pilot study on change in range of motion of adjacent segments following single level lumbar fusion using disk angle." [Link]
6. George, S. P., Saravana Kumar G & Venkatesh K., "Influence of Vertebral Disc angle on Interbody fusion Range of Motions," Fourth International conference on Biomechanics Clinical Spine and Orthopedics, Indian Spinal Injury Centre, Delhi, India (2021). [Link]
7. Oral Presentation on "Study on change in Range of motion of adjacent segments following Single Level Lumbar Fusion using disk angle" at Spine week, 2023, Melbourne.
8. Poster presented on "Validation of a Novel Lumbar Functional Spine Unit" at 18th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering, 2023, France. [Link]

## Patents & books

- o A patent published in Indian Patent Journal titled 'A DISPENSER FOR PREPARING AND DISPENSING FRESH LIME JUICE' (Application No. 201641044525 A,Publication Date: 21/04/2017).
- o Authored a book titled 'Design and Engineering' for First Year B Tech students of Kerala Technological University (Over 8000 copies sold). The book is a bird's eye-view to the world of Design and its associated aspects in Engineering. It serves to uncover the knowhow that an amateur designer needs to start with designing.
- o Design patent filed with filing number 393128-001 under the title "A battery-powered sit to stand device for paraplegic patients with Gas Springs" with IP Designs, India.
- o Design patent filed with filing number 393129-001 under the title "A battery-powered sit to stand device for paraplegic patients with Electric Actuator" with IP Designs, India.

## Positions of Responsibility

- o *Chief Executive Officer-Redento Technologies LLP* A Startup for designing and developing Assistive Technology devices. Monitored several new product developments that have potential for commercialization.Managed interns who worked with the design and prototyping.
- o *Principal Investigator* Development of a Robotic Mobilizer involving a sit-to-stand mechanism for Paraplegic Patients with Lower Limb Paralysis. Funded Project under Ministry of Social Justice and Empowerment, Govt of India, Department of Empowerment of Persons with Disabilities. A sit-to-stand mechanism was evolved (2016-2019).
- o *Principal Investigator* Development of a Rice Noodle maker for commercial applications. Funded Project under KSCSTE, Govt of Kerala.

## Achievements/Awards

- o School Topper 10th and 12 th CBSE board exams
- o Secured 97.55% in GATE 2008
- o Secured Prime ministers Research Fellowship -December 2020
- o First Prize in Spine Conference at CMC Vellore for "PROF GD SUNDARARAJ BEST PAPER SESSION"

- First Prize in AT Makathon Shasthra IITM -March 2021, for the project Robotic mobilizer for people with lower link paralysis([video](#))

## Others

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- **Hobbies:** Travelling, Cooking, Learning languages
- **Languages:** Malayalam, Hindi, English

## Declaration

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I do hereby declare that all the details furnished above are true to the best of my knowledge and belief.

Place: G7 1A-MSQ,IITM, Tamil Nadu (India)

(Subin P George)

Date: 04th Sep, 2023

Note: Highlighted are link to proofs and validation (if required).