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## Dr. Stefie J. Stephen

### EDUCATION

- Ph.D in Civil Engineering  
Indian Institute of Technology Madras, Chennai, India  
Dissertation title: “Incorporation of time-dependent fracture behavior in the structural design of fibre reinforced concrete elements” Sep 2019  
Guide: Prof. Ravindra Gettu
- M. E (First Class with Distinction) in Structural Engineering  
Government College of Technology, Coimbatore, Tamil Nadu, India  
Thesis title: “Study of nonlinear seismic response of irregular RC frame by embracing various structural components” May 2013  
Guide: V. M. Shanthi
- B. E (First Class with Distinction) in Civil Engineering  
A. C. College of Engineering and Technology, Karaikudi, Tamil Nadu, India  
Thesis title: “Analysis and design of bus terminus using STAAD Pro. and MATLAB” May 2011  
Guide: Kumar

### PROFILE SUMMARY

A profile with teaching, research and service components

- Teaching
  - 5 years of teaching assistantship experience at IIT Madras.
  - Assisted 8 interns and 3 M.Tech. students of IIT Madras, and 1 B.Tech. student of Nagaoka University of Technology, Japan towards completion of their project.
- Research
  - Doctoral research experience at IIT Madras.
  - Published **three SCI/Scopus indexed journal papers** as first author.
  - Published **three international conference papers**.
- Services
  - Helped in the establishment and maintenance of ‘Mechanical Performance and Characterization of Engineering Materials’ laboratory at IIT Madras.
  - Assisted in organizing international conference, national symposium and 5-day short-term course at IIT Madras.

## AWARDS AND SCHOLASTIC ACHIEVEMENTS

- Secured **20<sup>th</sup> rank** in B.E Anna University of Technology, Trichy, Tamil Nadu, India
- Paper Presentation:
  - Presented a paper on “**Microclimate in Building Design**” and won **first prize** in a National level technical symposium held at R.V.S College of Engineering & Technology, Dindigul, Tamil Nadu, India.
  - Presented a paper on “**Bacterial Concrete**” and won **second prize** in a State level technical symposium held at Government College of Engineering, Tirunelveli, Tamil Nadu, India.
  - Presented a paper on “**Trenchless Technology**” and won **second prize** in seminar held by Civil Engineering Association, A. C. College of Engineering and Technology, Karaikudi, Tamil Nadu, India.
- Participated in **technical quiz** and won **second prize** in a State level technical symposium held at Government College of Engineering, Tirunelveli, Tamil Nadu, India.

## PUBLICATIONS

### Journal Publications:

#### A. Paper publications in SCI/Scopus indexed journal

1. **Stephen S. J.**, Gettu R., Ferreira L. E. T., and Jose S., “*Assessment of the toughness of fibre reinforced concrete using the R-curve approach*”, *Sādhanā*, 43–46 (2018).
2. **Stephen S. J.**, Raphael B., Gettu R., and Jose S., “*Determination of the tensile constitutive relations of fibre reinforced concrete using inverse analysis*”, *Construction and Building Materials*, 195, 405-414 (2019).
3. **Stephen S. J.**, and Gettu R., “*Rate-dependence of the tensile behaviour of fibre reinforced concrete in the quasi-static regime*”, *Materials and Structures*, 52:107 (2019).

#### B. International conference proceedings (\* indicates presenter)

1. **Stephen S. J.**, Gettu R.\*, and Raphael B., “*Effect of loading rate on the fracture behaviour of fibre reinforced concrete*”, Proc. 9<sup>th</sup> International Conference on Fracture Mechanics of Concrete and Concrete Structures, FraMCoS-9 (Berkeley, USA), Eds. V. Saouma, J. Bolander and E. Landis, <http://framcos.org/FraMCoS-9/Full-Papers/71.pdf>, DOI 10.21012/FC9.071, 6 p. (2016)
2. **Stephen S. J.\***, Raphael B., and Gettu R., “*Obtaining fracture properties of FRC by inverse analysis using the PGSL optimization algorithm*”, Proc. 6<sup>th</sup> International Congress on Computational Mechanics and Simulation, ICCMS2016 (Mumbai, India), Eds. S. Pendhari, P. Nanthagopalan, V. Deshmukh, A. Bambole and Y. Desai, [http://www.iccms2016.org/Docs/ICCMS\\_Proceeding.pdf](http://www.iccms2016.org/Docs/ICCMS_Proceeding.pdf), 480 p. (2016)
3. Jose S.\*, **Stephen S. J.**, and Gettu R., “*Study of the post-cracking behaviour of steel and polymer fibre reinforced concretes*”, Proc. 2<sup>nd</sup> R. N. Raikar Memorial International Conference on Advances in Science and Technology of Concrete (Mumbai, India), 258p. (2015)

### C. Conference presentations

1. **Stephen S. J.\***, Jose S., and Gettu R., “*Benefits of hybrid combinations of amorphous metallic and steel fibres in structural applications*” the ACI Open Topic Session at the ACI Convention and Exposition in Las Vegas, NV, USA, 14 – 18<sup>th</sup> October, 2018 (Oral Presentation)
2. **Stephen S. J.**, and Gettu R.\*, “*Fatigue response of cracked fibre reinforced concrete*” the 73rd RILEM Week 2019-International Conference on Innovative Materials for Sustainable Civil Engineering in Nanjing, China, 26 – 30<sup>th</sup> August, 2019 (Oral Presentation)

### COPYRIGHTS

- ‘sigw-Concrete’, Software for obtaining tensile constitutive model of plain and fibre reinforced concrete using inverse analysis of experimental data from three-point bending tests of notched beams, IITM IDF1957, copyright being filed in India (Diary no. 18581/2019-CO/SW), Inventors: **S. J. Stephen**, R. Gettu and B. Raphael.

### SUMMER SCHOOL, TRAINING & INTERNSHIP

- Participated in the **Dresden International Summer School, Germany** on High Performance Fibre-Reinforced Cement-based Composites for Future Infrastructure, between 26 and 31 of July, 2015.
- Underwent in-plant training at **Consolidated Construction Consortium Ltd., Chennai** for 10 days.
- Underwent internship in the topic “Seismic Vulnerability of RC Buildings” in Civil Engineering Department (Structural Engineering Division) at **IIT Madras, Chennai** for a period of one month.

### TEACHING AND RESEARCH EXPERIENCE

As a teaching assistant during postgraduation period

- Basic Structural Design II - concrete (1 batch)
- Computer Application Laboratory (1 batch)

As a teaching assistant during doctoral tenure

- Modern Construction Materials (2 batches)
- NPTEL online course on ‘Modern Construction Materials’ (2 batches)
- Concrete Technology (1 batch)
- Building Material and Construction (1 batch)
- Construction Material Laboratory (1 batch)
- Assisted one undergraduate student (international student from Nagaoka University of Technology, Japan) towards the completion of project. Helped him with fabrication and testing of concrete beams under fatigue loading. Also, helped him with report preparation.
- Assisted three masters’ projects:
  - Stress-strain characteristics of high strength concrete (Oct 2015) – demonstrated the testing procedure in closed-loop system and helped with the thesis preparation
  - Stress-strain characteristics of plain and fibre reinforced high strength concrete under uniaxial loading (May 2017) – demonstrated the testing procedure in closed-loop system and helped with the thesis preparation

- Modelling of steel fibre reinforced concrete tunnel lining segment (May 2018) – demonstrated the numerical modelling in TNO DIANA and helped with the thesis preparation.

As a research scholar at IIT Madras

- Assisted in laying of FRC floor slabs (Mist room, Department of Civil Engineering - BTCM Division, IIT Madras)
- Have expertise in operating servo hydraulic closed-loop system
- Performed extensive testing on plain and fibre reinforced concrete beams, slabs and cylinders using advanced closed loop control system
- Extensively used advanced instrumentation gadgets such as clip gauge, circumferential extensometer, axial extensometer and LVDT
- Performed extensive fatigue testing on FRC cracked beams using the servo hydraulic system
- Performed finite element analysis of FRC beams and tunnel segments under different loading conditions using TNO DIANA
- Developed an analytical closed-loop solution for determining the tensile properties of FRC from the experimental flexural test data.

## PROFESSIONAL AND ACADEMIC SERVICES

- Membership of professional bodies
  - Affiliate Member of RILEM, International Union of Laboratories and Experts in Construction Materials, Systems and Structures
  - Life Member, Indian Concrete Institute
  - Life Member, Society for Failure Analysis
  - Safety committee member in Department of Civil Engineering at IIT Madras (in the year 2016)
- In charge of maintenance of 'Mechanical Performance and Characterization of Engineering Materials' laboratory (2015 and 2016)
  - Helped in the procurement of DAQ system
  - Designed and helped in the fabrication of calibrator and setup for beam testing
  - Developed template for monotonic and fatigue testing of beams and cylinders subjected to flexural and compressive loading, respectively
  - Helped in troubleshooting of various problems that arose in the MTS closed-loop testing system (hydraulic power unit, hydraulic service manifold, cooling tower, heat exchanger, etc.)
- Coordinator for different programs at IIT Madras
  - AICTE sponsored 5-day short-term course on Advanced Concrete Technology 2015 – registration and logistics
  - Concrete challenge event during CEA fest 2016 – evaluating teams based on slenderness, flexural toughness and compressive strength
  - National concrete canoe competition 2016 – registration
  - International Conference on Advances in Construction Materials and Systems 2017 and RILEM week – registration and logistics
  - 5<sup>th</sup> Concrete Research in India Symposium 2019 – overall coordinator of all events

## PARTICIPATION IN RESEARCH PROJECTS

### Project

- Energy absorption capacity tests performed on synthetic fibre reinforced shotcrete panels in relation to Chenani Nashri tunnel project
- Design of top layer of slabs for Apollo tyres plant, Chennai
- Characterization of fracture behavior of limestone calcined clay cement (LC3) concrete
- Flexural toughness characterization of steel fibre reinforced concrete in relation to the tunnel t-48 of Udhampur-Srinagar-Baramulla railway line project
- Environmental assessment pertaining to the proposed demolition of high-rise buildings in the CRZ of Maradu municipality, Kerala
- A new framework of high value added zero-waste recycling of concrete from construction and demolition waste

### Responsibilities

- Testing of shotcrete panels, analysis of result and report preparation
- Design of elevated slabs and report preparation
- Casting and testing of LC3 concrete to obtain complete stress-strain behavior
- Testing of beams, analysis of result and report preparation
- Collection of data, analysis and report preparation
- Casting, testing of recycled aggregate concrete and analysis of result

## RESEARCH INTERESTS

- Fracture mechanics of high-performance and sustainable concrete systems
- Numerical modelling of concrete structures
- Design of tunnel lining segments
- Fatigue characterization of concrete
- Creep and shrinkage behavior of high-performance concrete systems
- Structural health monitoring of concrete elements

## SOFTWARE SKILLS

Programming languages : Beginner in C and MATLAB  
Software Packages : TNO DIANA, SeismoStruct, AUTOCAD, ArchiCAD and STAAD Pro.

## PERSONAL PROFILE

Date of Birth: 17/03/1990  
Sex: Female  
Marital Status: Married  
Nationality: Indian  
Languages: English, Tamil

## References

- Prof. Ravindra Gettu  
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