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### Summary

His current research on structural safety and nonlinear dynamics has origins in his PhD work and it has been gaining depth and breadth through the continuation of this work, some of which is in collaboration with other members of the systems group and dynamics group.

The concept of vulnerability is applicable to all systems whether technical or social; however, recent work has shown that its usage differs. In the short term, he plans to examine the vulnerability of structures to dynamic progressive collapse using the concepts of energy. Considerations of non-linearity will provide new depth to vulnerability assessment of structures. Research is in progress to investigate the issues of modelling of non-linear systems and to identify the global behaviour of such systems. For exploring the nonlinear dynamics, he is keen to develop modelling and simulation tools on the high performance computing facilities.

Much of this research is directly relevant to the broader faculty themes of dynamics, intelligent structures and global change and it is being done in collaboration with other colleagues. He has established links with other researchers in structural safety, particularly through COST action on robustness of structures and membership of international scientific committees and editorial boards.

His long term vision is to create a generic framework for the vulnerability and risk assessment of infrastructures. This work is being done in a multi-disciplinary team. Infrastructures are complex systems and hierarchical modelling approaches will be used. This also requires dealing with uncertainty. Appropriate models will be developed in collaboration with other researchers in the faculty and elsewhere.

### Biography

Dr Jitendra Agarwal is a Senior Lecturer in Structural Engineering at the University of Bristol. His main areas of research are structural safety, non-linear dynamics, civil engineering systems and computational methods. He has 25 publications in reputed journals and refereed conferences. Prior to becoming a lecturer in 2002, he designed seismic modifications for nuclear plants while working for WS Atkins. From 1996 to 2001, he was a postdoctoral researcher working with Professor David Blockley. During this time he developed new approaches to assessing the vulnerability of structures. Earlier he has worked as a scientist for four years in Structural Engineering Research Centre and as a structural engineer in a design consultancy in India. His doctoral research (1991-1994) at the University of Bristol was funded by a Commonwealth Scholarship and he developed an Interacting Objects Process Model (IOPM) for the study of non-linear dynamics and tested it on parallel computing machines. He obtained his first degree in Civil Engineering in 1985 and a Masters degree in Computer Science in 1987 from Indian Institute of Technology Delhi, one of the top institutes in India.

### Keywords

- Networked infrastructure
- Civil Engineering Systems
- Structural safety and risk
- Nonlinear dynamics
- Physical process modelling
- High performance computing

## Expertise

My current research on structural safety and nonlinear dynamics has origins in my PhD work and it has been gaining depth and breadth through the continuation of this work, some of which is in collaboration with other members of the systems group and dynamics group. The concept of vulnerability is applicable to all systems whether technical or social; however, recent work has shown that its usage differs. In the short term, I plan to examine the vulnerability of structures to dynamic progressive collapse using the concepts of energy. Considerations of non-linearity will provide new depth to vulnerability assessment of structures. My long-term vision is to create a generic framework for the vulnerability and risk assessment of infrastructures. This work will be ideally done in a multi-disciplinary team.

- structural safety
- nonlinear dynamics
- dynamic progressive collapse
- vulnerability of structures
- risk assessment of infrastructures

## Memberships

### Organisations

[Department of Civil Engineering](#)

### Other sites

- [Engineering](#)

## Recent publications

- Agarwal, J & Galvan, G, 2019, '[Assessing the Vulnerability of Infrastructure Networks based on distribution measures](#)'. *Reliability Engineering and System Safety*.
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- Hashim, N & Agarwal, J, 2018, '[Rotational Stiffness of Precast Beam-Column Connection using Finite Element Method](#)'. *IOP Conference Series: Earth and Environmental Science*, vol 140.
- Zhuang, W & Agarwal, J, 2017, '[An improved measure of structural vulnerability](#)'.
- Agarwal, J, 2017, '[Vulnerability of Maritime Infrastructure: A Network Science Approach](#)'.
- Agarwal, J, 2017, '[Moving towards a resilient multi-modal transport network: Great Britain's case study](#)'.
- Liu, M, Agarwal, J & Blockley, DI, 2016, '[Vulnerability of road networks](#)'. *Civil Engineering and Environmental Systems*, vol 33., pp. 147-175
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