



Dynamics  
Research  
Group

## The 3rd Sheffield Workshop on Structural Dynamics Online Event 7<sup>th</sup>-10<sup>th</sup> December 2020

You are cordially invited to attend the 3<sup>rd</sup> Sheffield Workshop on Structural Dynamics, which this year will be hosted virtually.

We are celebrating 25 years of the Dynamics Research Group in Sheffield. To mark this, the workshop will open on the afternoon of 7<sup>th</sup> December with a retrospective review of our research over the last quarter century.

The main body of the workshop will have three distinct themes: physics-informed machine learning (8<sup>th</sup>), population-based SHM (9<sup>th</sup>) and digital-twins and their validation (10<sup>th</sup>).

The schedules for each day are on the following pages. If you haven't already registered please do so [here](#).





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7<sup>th</sup> December 2020

## Celebrating 25 years of the DRG in Sheffield

GMT			CEST	
Start	End		Start	End
13:30:00	13:45:00	Introduction and welcome, Graeme Manson	14:30:00	14:45:00
13:45:00	14:30:00	Historical perspectives, Jem Rongong	14:45:00	15:30:00
14:30:00	14:45:00	Break	15:30:00	15:45:00
14:45:00	15:30:00	Future challenges in structural dynamics, Keith Worden	15:45:00	16:30:00
15:30:00	16:00:00	Discussion and social	16:30:00	17:00:00





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8<sup>th</sup> December 2020

## Physics-informed machine learning

GMT			CEST	
Start	End		Start	End
09:30:00	10:00:00	Physics-informed machine learning for structural dynamics, Lizzy Cross, Dynamics Research Group	10:30:00	11:00:00
10:00:00	10:15:00	Nonparametric learning of Volterra kernels with Gaussian processes, Magnus Ross, Department of Computer Science, University of Sheffield	11:00:00	11:15:00
10:15:00	10:30:00	Deep Latent Force Models, Tom McDonald, Department of Computer Science, University of Sheffield	11:15:00	11:30:00
10:30:00	10:45:00	Break	11:30:00	11:45:00
10:45:00	11:15:00	The statistical finite element method (statFEM) for coherent synthesis of observation data and model predictions, Mark Girolami, University of Cambridge	11:45:00	12:15:00
11:15:00	11:45:00	Constrained Gaussian processes for Strain field reconstruction, Niklas Wahlström, Uppsala University	12:15:00	12:45:00
11:45:00	12:15:00	<b>Discussion session 1</b> - questions from talks. Suggested discussion topic: appropriate explanatory power of data and physics-driven models for different tasks	12:45:00	13:15:00
12:15:00	13:30:00	Lunch	13:15:00	14:30:00
13:30:00	14:00:00	Novel State-Space Approaches For Nonlinear Dynamic Systems, Tim Rogers, Dynamics Research Group	14:30:00	15:00:00
14:30:00	15:30:00	<b>Discussion session 2</b> - questions from talks. Suggested discussion topics: model validation, priorities and challenges for the future	15:30:00	16:30:00



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9<sup>th</sup> December 2020

## Population-based Structural Health Monitoring

GMT			CEST	
Start	End		Start	End
09:20:00	09:30:00	Introduction and welcome, Keith Worden, Dynamics Research Group	10:20:00	10:30:00
09:30:00	10:15:00	PBSHM for populations of bridges, David Hester, Queen's University Belfast	10:30:00	11:15:00
10:15:00	10:45:00	Graphs and hypergraphs for PBSHM, Julian Gosliga, Dynamics Research Group	11:15:00	11:45:00
10:45:00	11:00:00	Break	11:45:00	12:00:00
11:00:00	11:30:00	<b>Discussion session 1</b>	12:00:00	12:30:00
11:30:00	12:00:00	Extending the notion of forms in PBSHM: an experimental case study, Lawrence Bull, Dynamics Research Group	12:30:00	13:00:00
12:00:00	12:30:00	An approach to the problem of repair in SHM, Paul Gardner, Dynamics Research Group	13:00:00	13:30:00
12:30:00	13:30:00	Lunch	13:30:00	14:30:00
13:30:00	14:00:00	TBC	14:30:00	15:00:00
14:00:00	14:30:00	Graph neural networks and the normal section, George Tsialiamanis, Dynamics Research Group	15:00:00	15:30:00
14:30:00	15:30:00	<b>Discussion session 2</b>	15:30:00	16:30:00



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10<sup>th</sup> December 2020

## Digital-twins and their validation

GMT			CEST	
Start	End		Start	End
09:30:00	10:15:00	Connectivity and the digital twin; developing a web-based operational platform, David Wagg, Dynamics Research Group	10:30:00	11:15:00
10:15:00	11:15:00	LVV 2020 Showcase, Rob Barthorpe, Dynamics Research Group	11:15:00	12:15:00
11:15:00	11:30:00	Break	12:15:00	12:30:00
11:30:00	12:45:00	Discussion session - developing benchmarks for the structural dynamics community	12:30:00	13:45:00



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# The 3rd Sheffield Workshop on Structural Dynamics Laboratory for Verification & Validation: Open for Business

