iNCMDAO 2024

Full Programme

1st international and 7th National Conference on
Multidisciplinary Design, Analysis, and Optimization

(16 - 18 December 2024)

Jointly Organized by
Department of Mechanical Engineering, IISc, Bengaluru
and
Aeronautical Society of India

Programme

16 December 2024

A. R. Auditorium, Dept. of Mechanical Engineering, IISc

Keynote Lecture 1

11:00 AM to 11:50 AM

Multiobjective Optimization: Applications in Computational Biology

Prof. Sanghamitra Bandyopadhyay,
Indian Statistical Institute, Kolkata

Chair: Palaniappan Ramu

17 December 2024

J. N. Tata Auditorium, IISc

Keynote Lecture 2

09:00 AM to 09:45 AM

Multiscale and Third Medium Approaches in Topology Optimization

Prof. Ole Sigmund,
Denmark Technical University

Chair: Kota Harinarayana
Co-chair: Deepak Sharma

Keynote Lecture 3

12:00 PM to 12:45 PM

Rise of Evolutionary Multi-Criterion Optimization

Prof. Kalyanmoy Deb,
Michigan State University

Chair: Adimurthy
Co-chair: Anupam Saxena

17 December 2024

J. N. Tata Auditorium, IISc

Keynote Lecture 4

03:00 PM to 03:45 PM

AI and Machine Learning in Design Optimization: Emerging Developments

Prof. Prabhat Hajela,
Rensselaer Polytechnic Institute

Chair: Somanath Nagendra
Co-chair: Yoganand Garimella

18 December 2024

J. N. Tata Auditorium, IISc

Keynote Lecture 5

08:45 AM to 09:30 AM

Uncertainty Quantification for MDAO

Prof. Sankaran Mahadevan,
Vanderbilt University

Chair: S. Gopalakrishnan
Co-chair: Faez Ahmad

Invited speakers : Session 1

17 December 2024 | 10:00 AM to 10:30 AM | J. N. Tata Auditorium

Topology Optimization using Neural Networks

Prof. Krishnan Suresh,
University of Wisconsin, Madison, USA

Main Hall
Chair: Prabhat Kumar **Co-chair**: Sachin Singh Gautham

Towards a Digital Twin Framework in Additive Manufacturing

Prof. Wei Chen,
Northwestern University, USA

Hall A
Chair: Anupam Saxena **Co-chair**: Pragya Tripathi

Collaborative System of Systems Aviation Optimization - Opportunity and Challenges

Mr. Prajwal Shiva Prakasha,
DLR, Germany

Hall B
Chair: Gil Ho Yoon **Co-chair**: Saurabh Gairola

Optimization for Robots and robotic Systems: A Forty Year Story at IGMR

Prof. Corves Burkhard,
RWTH-Aachen, Germany

Hall C
Chair: Deepak Sharma **Co-chair**: Vivek Kumar

Invited speakers : Session 2

17 December 2024 | 04:00 PM to 04:30 PM | J. N. Tata Auditorium

Rethinking Engineering Design with Generative AI

Prof. Faez Ahmed,
Massachusetts Institute of Technology, USA

Main Hall
Chair: Krishnan Suresh **Co-chair**: Tamaraiselvi Kumaresan

Computational Reconstruction of Heterogenous Material Behavior from Simple Contact Probing

Prof. Roger A. Sauer,
Ruhr-Universität Bochum, Germany

Hall A
Chair: Wei Chen **Co-chair**: Mangaiyarkarasi Padmanaban

Synthesis and Optimisation of the Dimensions of Mechanisms – Experiences and Lessons Learned

Prof. Mathias Huesing,
RWTH-Aachen, Germany

Hall B
Chair: Rut Lineswala **Co-chair**: Vivek Kumar

Role of Structural Optimization in Aerospace Mechanisms Design

Mr. Pakeeruraju P,
MDSD & DRDL

Hall C
Chair: A. R. Upadhya **Co-chair**: Aman Mohd. Khalid

Invited speakers : Session 3

18 December 2024 | 09:45 AM to 10:15 AM | J. N. Tata Auditorium

A New Modeling Scheme for Multiphysics Systems and Structural Optimization

Prof. Gil Ho Yoon,
Hanyang University, South Korea

Main Hall
Chair: Kalyanmoy Deb **Co-chair**: Meenu Krishnan

Optimisation Aspects in Computational Modelling of Operated Ventral Hernia in the Context of its Mechanical Compatibility with a Human Abdominal Wall

Prof. Izabella Lubowiecka,
Gdańsk University of Technology, Poland

Hall A
Chair: Corves Burkhard **Co-chair**: Naman Jain

Transforming Aircraft Engines with AI

Mr. Rajesh Alla,
Director of Data Science, GE Aerospace

Hall B
Chair: Prajwal Shiva Prakasha **Co-chair**: Mandyam Sridhar

Panel Discussions

Panel Discussion 1 ***16 December, 02:00 PM to 02:45 PM***

Careers in MDAO and Industry Academia Role

Moderator: Dr. Ravi Salagame, Autobotik

Panel Members: Dr. S. Shamasundar, ProSIM R & D
Shri. Ashish Mishra, Ather Energy
Dr. Vivek Sanghi, Aeronautical Engineer, Advisor, Trainer, Consultant
Prof. Wei Chen, Northwestern University
Dr. Yoganand Garimella, DRDO

Panel Discussion 2 ***17 December, 02:00 PM to 02:45 PM***

Towards Full-scale MDAO Problems in India

Moderator: Dr. Pankaj Priyadarshi, VSSC

Panel Members: Shri. Jitendra J Jadhav, Aeronautical Development Agency
Shri. M. Mohan, Director (Projects), VSSC
Dr. Pankaj A C, Systems Engineering Division, NAL
Dr. Manish Garg, TVS Motor Company

Panel Discussion 3 ***18 December, 12:15 PM to 01:00 PM***

Optimal Use of Data in Aviation

Moderator: Dr. GVV Ravi Kumar, Infosys
Dr. Ravi Rajamani, Independent Data Consortium for Aviation

Panel Members: Dr. Satish Chandra, formerly, National Aerospace Laboratories
Dr. CS Adishesha, Collins Aerospace
Dr. Ramakrishnan (Ramki) Raman, Eaton

Panel Discussion 4 ***18 December, 02:00 PM to 02:45 PM***

Optimization at the Cross-roads of Machine Learning (ML), Generative Artificial Intelligence (Gen AI) & Model Based Systems Engineering (MBSE)

Moderator: Dr. Vinay Ramanath, Siemens

Panel Members: Dr. Dhanesh Padmanabhan, Stealth works, ex GM India Science lab
Dr. Rishi Relan, Siemens Energy
Dr. Shamik Chaudhuri, Walmart labs, ex GE
Prof. Faez Ahmed, MIT

DAY 0

16 December 2024

16 December 2024

A. R. Auditorium, Dept. of Mechanical Engineering, IISc

Masterclass 1

09:00 AM to 10:50 AM

Evolutionary Optimization for Practical Problem-Solving Tasks

Prof. Kalyanmoy Deb,
Michigan State University, USA

***Chair**: Palaniappan Ramu*

Keynote Lecture 1

11:00 AM to 11:50 AM

Multiobjective Optimization: Applications in Computational Biology

Prof. Sanghamitra Bandyopadhyay,
Indian Statistical Institute, Kolkata

***Chair**: Palaniappan Ramu*

Springer Nature Workshop for Authors

12:00 PM to 12:45 PM

Ms. Swati Meherishi, Springer Nature

Panel Discussion 1: Careers in MDAO and Industry Academia Role

02:00 PM to 02:45 PM

Moderator: Ravi Salagame, Autobotik

Masterclass 2

03:00 PM to 04:50 PM

Controlling Geometry in Topology Optimization: Grey scale, Filtering, Robustness and Uncertainties

Prof. Ole Sigmund,
Denmark Technical University, Denmark

***Chair**: G K Ananthasuresh*

BosonQPsi Workshop on Quantum Computing

05:00 PM to 06:00 PM

Conference Reception at J N Tata Auditorium followed by Dinner

06:30 PM onwards

DAY 1

17 December 2024

Day 1: Tuesday, Dec 17

Time	Program Details			
08:45-09:00	Introduction			
09:00-09:45	Keynote Lecture 2: **Ole Sigmund**, *Denmark Technical University* *Chair: Kota Harinarayana; Co-chair: Deepak Sharma*			
09.45-10.00	BREAK			
Session 1				
Parallel Tracks	Track 1	Track 2	Track 3	Track 4
10:00-10:30	IT 1# **Krishnan Suresh**	IT 2 **Wei Chen**	IT 2 **Prajwal Shiva P**	IT 4 **Burkhard Corves**
10:30-11:45	S1T1*	S1T2	S1T3	S1T4
12:00-12:45	Keynote Lecture 3: Kalyanmoy Deb, *Michigan State University* *Chair: Adimurthy; Co-chair: Anupam Saxena*			
12:45-14:00	LUNCH			
14:00-14:45	Panel Discussion 2: Full-scale MDAO Problems in India Moderator: Pankaj Priyadarshi			
15:00-15:45	Keynote Lecture 4: Prabhat Hajela, *Rensselaer Polytechnic Institute* *Chair: Somanath Nagendra; Co-chair: Yoganand Garimella*			
15:45-16:00	BREAK			
Session 2				
Parallel Tracks	Track 1	Track 2	Track 3	Track 4
16:00-16:30	IT 5 **Faez Ahmed**	IT 6 **Roger Sauer**	IT 7 **Mathias Huesing**	IT 8 **Pakeeruraju P**
16:30-17:45	S2T1	S2T2	S2T3	S2T4
17:45-18:30	Networking and Mixer			
18:30-19:30	Carnatic Music Concert by Prof Sankaran Mahadevan			
19:30 Onwards	Banquet Dinner			

#IT i = Invited Talk i

*SiTj – Session i Track j | i=1,2,3,4 | j=1,2,3,4

Day 1: Tuesday, Dec 17

Session 1

Track 1: Topology Optimization **S1 T1** | **Main Hall**
Chair: Prabhat Kumar | | Co Chair: Sachin Singh Gautham

10:00 – 10.30	**Invited Talk 1**
	Topology Optimization Using Neural Networks *Prof. Krishnan Suresh, Univ. Wisconsin, Madison, USA*

Paper ID	Time	Title
47	10:30 – 10:45	**Large-Scale Topology Optimization: Addressing Industrial Challenges Through Parallel Computation and Memory Management** *U Meenu Krishnan, Rajib Chowdhury*
11	10:45 – 11:00	**Isogeometric Topology Optimization of Auxetic Metamaterials** *Philip Luke Karuthedath, Anurag Gupta, Abhinav Gupta, Rajib Chowdhury*
8	11:00 – 11.15	**Inverse Design of Nonlinear Phononic Metamaterials for Nonlinear Wave Cloaking** *Pravinkumar Ghodake*
58	11:15 – 11:30	**Topology Optimization based Design of a Fluid Diode** *Sourav Rakshit, Sumandeep Rana*

Track 2: Surrogates, Metamodels and Medical Applications **S1 T2** | **Hall A**
Chair: Anupam Saxena | | Co-chair: Pragya Tripathi

10:00 – 10.30	**Invited Talk 2**
	Towards a Digital Twin Framework in Additive Manufacturing *Prof. Wei Chen, Northwestern University, USA*

Day 1: Tuesday, Dec 17

Session 1

Track 2: Surrogates, Metamodels and Medical Applications **S1 T2** | **Hall A**

Chair: Anupam Saxena || Co-chair: Pragya Tripathi

Paper ID	Time	Title
64	10:30 – 10:45	**3D Printed Insoles with Topology Optimized Metamaterials: Towards Personalized Solutions for Diabetic Foot Care** *Mehul Bagaria, Anurag Gupta, Rajib Chowdhury*
18	10:45 – 11:00	**Dynamic Metamodel Updating Using Gaussian Processes and Transformers for Digital Twins in Manufacturing** *Vispi Karkaria, Wei Chen*
39	11:00 – 11.15	**Meniscus Microstructure Inspired Energy Dissipation Materials** *Sachin Gunda, Will Sterling, Konstantin Kikinov, Stephen Rudyk, Kalin Dragnevski, Jack Waghorne, Daniel Bell, Olga Barrera, Sundararajan Natarajan*
25	11:15 – 11:30	**Computation of Blood Flow Dynamics in a Model Cerebral Aneurysm** *Aishwarya R, Shankar Narayan S, M. Sivapragasam, Vinay M. D. Prabhu*
46	11:30 – 11:45	**Large-Scale Phase-Field Fracture: An Adaptive Mesh Refinement Enhanced Sparse Polynomial Chaos Expansion Approach for Enhanced Fracture Prediction** *Avinandan Modak, U Meenu Krishnan, Rajib Chowdhury*

Track 3: Others **S1 T3** | **Hall B**

Chair: Gil Ho Yoon || Co-Chair: Saurabh Gairola

10:00 – 10.30	**Invited Talk 3**
	Collaborative System of Systems Aviation Optimization – Opportunity and Challenges *Mr. Prajwal, German Aerospace Center (DLR), Germany*

Day 1: Tuesday, Dec 17

Session 1

Track 3: Others **S1 T3 | Hall B**

Chair: Gil Ho Yoon | | Co-Chair: Saurabh Gairola

Paper ID	Time	Title
38	10:30 – 10:45	**Novel approach to needle bearing fault detection using CLIP fine-tuning** *Balaji Chandrasekharan, Vamanie Perumal*
04	10:45 – 11:00	**Automation of Tri-Axis Antenna Control Servo System** *Nagalakshmi G, Mukesh Kumar Singh, Radha Nayani, Koteswara Rao K, Uma Devi G*
20	11:00 – 11.15	**Optimized Antenna & Receive-Chain Assignment to Satellite Passes at Remote Sensing Ground Station** *Mukesh Kumar Singh, Koteswara Rao K, Uma Devi G, Radha Nayani*
29	11:15 – 11:30	**An Exploration of Performance-based Architectural Design Using Generative Design: Framework for Design Development from Early to Detailed Design Stages** *Hari Venkat, Saravanan Srinivasan, Subhashini S*
56	11:30 – 11:45	**Design Optimisation of Canard Planform for a Typical Fighter Aircraft** *Kishan Kanade, Valliammai Somasundaram*

Track 4: Quantum/ Evolutionary **S1 T4 | Hall C**

Chair: Deepak Sharma | | Co-Chair: Vivek Kumar

10:00 – 10.30	**Invited Talk 4**
	Optimization for Robots and Robotic Systems; A Forty Year Story at IGMR *Prof. Burkhard Corves, RWTH-Aachen, Germany*

Day 1: Tuesday, Dec 17

Session 1

Track 4: Quantum/ Evolutionary **S1 T4 | Hall C**

Chair: Deepak Sharma | | Co-Chair: Vivek Kumar

Paper ID	Time	Title
83	10:30 – 10:45	**Handling Objective Preference and Variable Uncertainty in Evolutionary Multi-objective Optimization** *Deepanshu Yadav, Palaniappan Ramu, Kalyanmoy Deb*
33	10:45 – 11:00	**Quantum-Ready Genetic Algorithm with Novel Operators to Solve Combinatorial Optimization Problems** *Aman Kashyap, Naman Jain, Deepak Nagar*
105	11:00 – 11.15	**Optimum Cost of Air Cooling System Using Teaching-Learning based Optimization Algorithm** *Prafulla Kulkarni*
133	11:15 – 11:30	**Structural Shape Optimization with Quantum Inspired Evolutionary Optimization Using BQPhy** *Kandula Eswara Sai Kumar, Priyabrata Maharana, Surya Sai, Anoop N G, Abhishek Chopra, Rut Lineswala*
81	11:30 – 11:45	**Enhancing Lithium-Ion Battery Performance for Electric Vehicles: Optimization of Electrochemical Parameters Using Genetic Algorithm** *Mangaiyarkarasi Padmanaban, Sneha Jayaganthan, Jayaganthan Rengaswamy*

Session 2

Track 1: Topology Optimization **S2 T1 | Main Hall**

Chair: Krishnan Suresh | | Co-Chair: Tamaraiselvi Kumaresan

16:00 – 16:30	**Invited Talk 5**
	Rethinking Engineering Design with Generative AI *Prof. Faez Ahmed, Massachusetts Institute of Technology (MIT), USA*

Day 1: Tuesday, Dec 17

Session 2

Track 1: Topology Optimization **S2 T1** | **Main Hall**

Chair: Krishnan Suresh | | Co-Chair: Tamaraiselvi Kumaresan

Paper ID	Time	Title
67	16:30 – 16:45	**A Unified and Efficient Isogeometric Framework for Sequential Shape and Topology Optimization** *Prashoon Gupta, Philip Luke Karuthedath, Abhinav Gupta, Rajib Chowdhury*
72	16:45 – 17:00	**Design and Development of Wide Bandgap in Single Phase Metamaterial Using Topology Optimization** *Kamal Shanker Patel, Nitish Kumar, Mehul Bagaria*
78	17:00 – 17.15	**Topology Optimization of Auxetic Metamaterial Structures for Enhanced Armor Design** *Vaibhav Bhandari, U Meenu Krishnan, Arya Prakash Padhi, Rajib Chowdhury, Anupam Chakrabarti*
02	17:15 – 17:30	**Pytopress: Python Code for Topology Optimization of Structures Subjected to Design-Dependent Pressure Loads** *Shivajay Saxena, Swagatam Islam Sarkar, Prabhat Kumar*

Track 2: Structures/ Materials/ AM **S2 T2** | **Hall A**

Chair: Wei Chen | | Co-Chair: Mangaiyarkarasi Padmanaban

16:00 – 16:30	**Invited Talk 6**
	Computational Reconstruction of Heterogenous Material Behaviour from Simple Contact Probing *Prof. Roger Sauer, Ruhr-Universität Bochum, Germany*

Paper ID	Time	Title
43	16:30 – 16:45	**Bayesian-Driven Flaw Identification Framework in Structures Using Strain Data** *Raghul G, Pugazhenthi Thananjayan, Sundararajan Natarajan, Palaniappan Ramu*
42	16:45 – 17:00	**Adaptive Phase Field Modeling of Hydro-Thermal Crack Propagation in Thermo-poroelastic Media Using the Scaled Boundary Finite Element Method** *Suvin VS, Ean Tat Ooi, Chongmin Song, Sundararajan Natarajan*

Day 1: Tuesday, Dec 17

Session 2

Track 2: Structures/ Materials/ AM **S2 T2** | **Hall A**

Chair: Wei Chen | | Co-Chair: Mangaiyarkarasi Padmanaban

Paper ID	Time	Title
74	17:00 – 17.15	**Modeling of Bond Strength in Concrete Using Phase Field Fracture Techniques** *Kamal Shanker Patel, Govind Gaurav, Mehul Bagaria*
75	17:15 – 17:30	**Phase Field Fracture Modeling of Size Effects in Shear Reinforcement of Concrete Beams** *Krishan Dutt Yadav, Kamal Shanker Patel, Mehul Bagaria, BS Chauhan*
90	17:30 – 17:45	**Sand Inclusion Composite Structures for Enhanced Ballistic Impact Resistance** *Manas Kishor Thakur, Nishika Nakka, Jyothsnavi Bommiditha, Sai Sahasra Surkanti, Shiva Bansal, Srikant Padhee*

Track 3: Size and Shape Optimization **S2 T3** | **Hall B**

Chair: Rut Lineswala | | Co-Chair: Vivek Kumar

16:00 – 16:30	**Invited Talk 7**
	Synthesis and Optimisation of the Dimensions of Mechanisms - Experiences and Lessons Learned *Prof. Mathias Huesing, RWTH-Aachen, Germany*

Paper ID	Time	Title
86	16:30 – 16:45	**Effect of Flow Fidelity on Active Learning Optimization for Shape Optimization** *Yuvraj Sarout, Mohamed Jebahi, Sofiane KHELLADI*
85	16:45 – 17:00	**Shape Optimization of Contact Elements for Uniform Stress Distribution Using IGA** *Sumit Kumar Das, Konatham Raja Sekhar, Sachin Singh Gautam, Hari Voruganti*
16	17:00 – 17.15	**Support Plate Shape Optimization for Thomson Coil Actuator** *Vishakha Harlapur, Salil Kulkarni*

Day 1: Tuesday, Dec 17

Session 2

Track 3: Size and Shape Optimization **S2 T3 | Hall B**

Chair: Rut Lineswala | | Co-Chair: Vivek Kumar

Paper ID	Time	Title
66	17:15 – 17:30	**Design Optimization of Bistable Low Arches** *Bhandarikumar Purohit, Sourav Rakshit*
30	17.30 – 17.45	**Identifying the Significance and Interdependency of Design Variables on Performance Metrics between Single-Storey and Multi-Storey Buildings Using Multi-Objective Optimization.** *Hari Venkat, Subhashini S, Saravanan Srinivasan*

Track 4: Emerging Areas **S2 T4 | Hall C**

Chair: A. R. Upadhya | | Co-Chair: Aman Mohd Khalid

16:00 – 16:30	**Invited Talk 8**
	Role of Structural Optimization in Aerospace Mechanisms Design *Dr. Pakeeruraju P, Scientist F, Defence Research & Development Laboratory*

Paper ID	Time	Title
49	16:30 – 16:45	**Shape Optimizations of Unit Cell for Multiband Metamaterial Absorbers in Optical Applications** *Radha Yadav, Mehul Bagaria, Rajib Chowdhury*
69	16:45 – 17:00	**Integrated Topological Optimization and Implicit Geometry Reconstruction with Field Optimization for Enhanced Structural Efficiency** *Kamal Shanker Patel, Mehul Bagaria*
121	17:00 – 17.15	**Enhanced Cost Priority Number Analysis after FMEA by Incorporating Effective Productivity Factors to Evaluate Most Preemptive Cause Of E-Waste** *Siba Ram Baral, Prerna Gautam*
128	17:15 – 17:30	**Machine Learning-Enhanced Reduced Order Modeling for BIW Design Optimization: A Study in Frequency Response Reduction** *Eshan Amalnerkar, Vidit Sharma, Anuj Shukla, Anirudha Joshi*
97	17:30 – 17:45	**Leveraging XR to Accelerate the Design Cycle** *Javed Akhter Shaik, Vimal Chander, Vinay Ramanath, Manivannan M, Palaniappan Ramu*

DAY 2

18 December 2024

Day 2: Wednesday, Dec 18

Time	Program Details			
08:45-09:30	Keynote Lecture 5: Sankaran Mahadevan, *Vanderbilt University* *Chair: S. Gopalakrishnan; Co-chair: Faez Ahmad*			
09.45-10.00	BREAK			
Session 3				
Parallel Tracks	Track 1	Track 2	Track 3	Track 4
09:45-10:15	IT 9 **Gil Ho Yoon**	IT 10 **Izabella Lubowiecka**	IT 11 **Rajesh Alla**	**--**
10:15-12:15	S3T1	S3T2	S3T3	S3T4
12:15-13:00	Panel Discussion 3: Optimal Use of Data in Aviation Moderator: Dr. Ravi Rajamani			
13:00-14:00	LUNCH			
14:15-15:00	Panel Discussion 4: Optimization at the Cross-roads of ML, Gen AI & Model Based Systems Engineering (MBSE) Moderator: Vinay Ramanath			
Session 4				
Parallel Tracks	Track 1	Track 2	Track 3	Track 4
15:00-16:45	S4T1	S4T2	S4T3	S4T4
16:45-17:00	BREAK			
17:00-18:00	Valedictory and Awards Session; Chair: Sivapragasam; Co-chair: Sourav Rakshit			

Day 2: Wednesday, Dec 18

Session 3

Track 1: Topology Optimization **S3 T1** | **Main Hall**
Chair: Kalyanmoy Deb | | Co-Chair: Meenu Krishnan

09:45-10:15	**Invited Talk 9**
	A New Modeling Scheme for Multiphysics Systems and Structural Optimization *Prof. Gil Ho Yoon, Hanyang University, South Korea*

Paper ID	Time	Title
7	10:15 – 10:30	**Basis Splines for Topology Optimisation of Elements of a Building** *KNV Chandrasekhar, V Bhikshma*
10	10:30 – 10:45	**Performance Enhancement of Ribbed Wall Microchannel Through Topology Optimization** *Hithaish Doddamani, Ryotaro Ikematsu, Masahiro Tada, Kentaro Yaji*
32	10:45 – 11:00	**An Integrated Topology Optimization-Phase Field Approach for the Design of Defect Tolerant Structures** *Rakesh kumar Tota, Paggi Marco*
54	11:00 – 11:15	**Topology Optimization of Contact-Aided Compliant Mechanisms for Tracing Multi-Kink Paths** *Prabhat Kumar, Roger A Sauer, Anupam Saxena*
55	11:15 – 11:30	**Bidirectional Evolutionary Structural Optimization (BESO) based Design Optimization Method Using Scaled Boundary Finite Element Method.** *Mohammed Saif Siddiqui, Harsh Kumar, Sourav Rakshit*
60	11:30 – 11:45	**Topology Optimization for Efficient Support Structure Designs in Additive Manufacturing** *Rajit Ranjan, Prabhat Kumar, Can Ayas, Matthijs Langelaar*

Track 2: Others **S3 T2** | **Hall A**
Chair: Corves Burkhard | | Co-Chair: Naman Jain

09:45-10:15	**Invited Talk 10**
	Optimisation Aspects in Computational Modelling of Operated Ventral Hernia in the Context of its Mechanical Compatibility with a Human Abdominal Wall *Prof. Izabella Lubowiecka, Gdansk Univ. Tech, Poland*

Day 2: Wednesday, Dec 18

Session 3

Track 2: Others **S3 T2** | **Hall A**
Chair: Corves Burkhard | | Co-Chair: Naman Jain

Paper ID	Time	Title
110	10:15 – 10:30	**Navigating the Unknown and Uncertain: A Sensitivity-Driven Optimisation Framework for High-Fidelity Battery Modelling** *Pragya Tripathi, Rishi Relan*
103	10:30 – 10:45	**Influence of Magnetic Field Angle on Velocity Profile and Pressure Drop in MHD Flow within a Sudden Expansion Channel** *Rupesh Baroniya, Manoj Arya*
111	10:45 – 11:00	**Framework for Optimizing Functionally Graded Materials in Thermoelastic Applications Using Genetic Algorithm and Novel Profile Generation Scheme** *Piyush Agrawal*
134	11:00 – 11:15	**Temperature Tunability of Acoustic Metasurface Absorber for Low-Frequency** *Krupali Donda*
71	11:15 – 11:30	**Aerodynamic Characterization and Flight Trajectory Reconstruction Using Pressure Measurements for a Spent Stage Re-Entry with Inflatable Aerodynamic Decelerator** *Leya Joseph, Padmanabha Prasanna Sinha, Aman Chauhan, Pankaj Priyadarshi*
116	11:30 – 11:45	**Assessment of Sound Noise Power of Transformers through Computational Modelling and Simulation** *Pawan Kumar Yadav, Saurabh Prakash, Vishal Pawar*
117	11:45 - 12:00	**Lightning Impulse Analysis of Oil Cooled Transformer Using ANSYS Maxwell** *Vivek Kumar, Sarvesh Kulkarni, Vishal Pawar*
12	12:00 – 12:15	**An Holistic Approach for Estimation in Software Product Development and Delivery in Agile Software Development** *Sandeepak Singh*

Track 3: Structural applications / Materials / AM **S3 T3** | **Hall B**
Chair: Prajwal Shiva Prakasha | | Co-Chair: Mandyam Sridhar

09:45-10:15	**Invited Talk 11**
	From Concept to Sky: Transforming Aircraft Engines with AI *Dr. Rajesh Alla, General Electric (GE)*

Day 2: Wednesday, Dec 18

Session 3

Track 3: Structural applications / Materials / AM **S3 T3 | Hall B**

Chair: Prajwal Shiva Prakasha || Co-Chair: Mandyam Sridhar

Paper ID	Time	Title
109	10:15 – 10:30	**Residual Life Evaluation of Cracked Aircraft Fuselage Skin with Rivet Holes** *P M Varun Krishnan, Mohan Kumar M*
101	10:30 – 10:45	**Build Orientation Optimization Using a Multi-Objective Framework for Minimizing Build Time and Surface Roughness of Fused Filament Fabricated Lattice Structure Part** *Farhanuzzaman Khan, Rahul Ramachandran, Saravana Kumar Gurunathan*
82	10:45 – 11:00	**Enhancing the Strength of Adhesively Bonded Joints through Natural Fiber Integration** *Aastha Patil, Mallikarjun Chinagundi, Aital Shaikh, Chinmayi Hosamani, Lokamanya Chikmath, Ramanath MN*
77	11:00 – 11:15	**Fracture Prediction of Single Reinforced Concrete Beams Using Meso-Scale Simulation with Phase Field Modeling and XCT Images** *Deepak Kumar Dewangan, Kamal Shanker Patel, Mehul Bagaria*
76	11:15 – 11:30	**Fracture Prediction of Concrete Using Meso-Scale Simulation with Phase Field Modeling and XCT Images** *Alok Pradhan, Kamal Shanker Patel, Mehul Bagaria*
70	11:30 – 11:45	**Modelling of Crack Propagation in Batteries Using the Scaled Boundary Finite Element Method and Phase Field Method** *Madhavi Reddy Goddilla Vani, Sundararajan Natarajan, Gregory Legrain, Nicolas Chevaugeon*
53	11:45 – 12:00	**A Microstructure-based Simulation of Mixed-Mode Hydrogen Induced Cracking Using Phase Field Model** *Thamaraiselvi Kumaresan, Sundararajan Natarajan*
96	12:00 – 12:15	**A Deep Learning-based Approach for Flaw Detection Using Strain Field Data** *Pugazhenthi Thananjayan, Sundararajan Natarajan, Palaniappan Ramu*

Track 4: ML/AI Driven Optimization **S3 T4 | Hall C**

Chair: Mathias Huesing || Co-Chair: Saravanan Chidambaranathan

Paper ID	Time	Title
17	10:15 – 10:30	**Towards a Digital Twin Framework in Additive Manufacturing: Machine Learning, Bayesian Optimization and Model Predictive Control for Time Series Process Optimization** *Wei Chen, Vispi Karkaria*
40	10:30 – 10:45	**Data-Driven Multi Objective Optimization of Process Parameters in Additive Manufacturing of Al Alloy** *Mohan Raj Murugesan, Palaniappan Ramu, Jayaganthan Rengaswamy*

Day 2: Wednesday, Dec 18

Session 3

Track 4: ML/AI Driven Optimization **S3 T4** | **Hall C**

Chair: Mathias Huesing | | Co-Chair: Saravanan Chidambaranathan

Paper ID	Time	Title
93	10:45 – 11:00	**Feature Selection and Feature Interaction Using Interpretable Self-Organizing Map** *Velduti Venkata Kishore, Deepanshu Yadav, Palaniappan Ramu*
24	11:00 – 11:15	**Multi-Fidelity Data Fusion for Aerodynamic Optimization at Low Reynolds Numbers** *Arjula Abhiram Reddy, Sudeeksha Suresh, Karthikeyan B.R., Sivapragasam M*
23	11:15 – 11:30	**Integrating Material Selection with Topology Optimization Using Variational Autoencoders** *Saketh Sridhara, Krishnan Suresh*
28	11:30 – 11:45	**Generative Adversarial Networks for Local Contact Search** *Ankit Singh, Deep Haloi, Saurav Sukla Baidya, Roger A. Sauer, Sachin Singh Gautam*
37	11:45 – 12:00	**Firebrand Generation Time Prediction: A Machine Learning Perspective** *Rohit Kumar Sharma, Deepak Sharma, Millie Pant*
57	12:00 – 12:15	**GO-GAN: Geometry Optimization Generative Adversarial Network for Achieving Optimized Structures with Targeted Physical Properties.** *A Padmaprabhan, Shriram Hari, Nived Philip Thomas, Khaish Chadha, Sai Sidhardh, Viswanath Chinthapenta, Prabhat Kumart*

Session 4

Track 1: Topology Optimization **S4 T1** | **Main Hall**

Chair: Indira Narayanaswamy | | Co-Chair: Pragya Tripathi

Paper ID	Time	Title
9	15:00 – 15:15	**Sculpting Linear and Nonlinear Elastic Waves: Exploring Inverse Design Potentials** *Pravinkumar Ghodake*
63	15:15 – 15:30	**Isogeometric Topology Optimization of Gear Tooth** *Mihirkumar Sevak, Harsh Kumar, Sourav Rakshit*
113	15:30 – 15.45	**A Two-Stage Integrated Approach for Accelerating Structural Topology Optimization Using VAE and SIMP** *Deepak Sharma, Aman Kumar, Subhajit Sanfui, Ramsatish Kaluri*
107	15:45 – 16:00	**Compliance Minimization of Kresling Origami-inspired Truss Structure** *Jayanta Halder, Phanisri Pradeep Pratapa*

Day 2: Wednesday, Dec 18

Session 4

Track 1: Topology Optimization **S4 T1 | Main Hall**

Chair: Indira Narayanaswamy || Co-Chair: Pragya Tripathi

Paper ID	Time	Title
124	16:00 – 16:15	**Parametric Study on Designing Natural Convection Based Micropump for Maximising Flow Rate Using Density Based Topology Optimisation** *Om Venkata Bhargava Rama Reddy Karri, Sourav Rakshit*
98	16:15 – 16:30	**Shape Design of Compliant Mechanisms Using Interactive Graphic Statics of Equivalent Trusses** *Deepak Kumar Gupta, G. K. Ananthasuresh*

Track 2: Applications in Automotive and Space **S4 T2 | Hall A**

Chair: Ravi Salagame || Co-Chair: Narahari

Paper ID	Time	Title
104	15:00 – 15:15	**Exergy and Emissions Analysis of Turbocharged Common Rail Direct Injection Diesel Engine with Hydrogen Enrichment** *Kaustubh Singh, Tikendra Nath Verma, Gaurav Dwivedi*
126	15:15 – 15:30	**Aerodynamic Analysis of Multi-Element Inverted Airfoil of Race Cars for Improved Ground Effect Performance** *Umesh S, A T Sriram, M Sivapragasam*
129	15:30 – 15.45	**Optimizing Nurse Schedules via Pareto Optimization – A Case Study** *Rutvij Tole, Millie Pant*
123	15:45 – 16:00	**Multi-Disciplinary Optimization of a Space Tourism Crew Module** *Aryavatsa Agarwal, Leya Joseph*
21	16:00 – 16:15	**Integrating Multi-Fidelity Data in Generative Diffusion Models for High-Performance Design Optimization** *Nicholas Sung, Mohamed Elrefaie, Faez Ahmed*
120	16:15 – 16:30	**Electro-Mechanical Relief Valve Using an Elastomeric Dome** *Michael John Bosco, G. K. Ananthasuresh, Paul Gilmore, Gurmeet Singh, Umesh Gandhi*

Day 2: Wednesday, Dec 18

Session 4

Track 3: Design under Uncertainties and Robustness **S4 T3** | **Hall B**

Chair: Pakeeruraju Podugu | | Co-Chair: Sujashree R. (Siemens)

Paper ID	Time	Title
15	15:00 – 15:15	**Risk-Informed Design Enhancement of Crew-Cabin Pressure Control System Simulator for Space Missions** *Srinidhi Gonahal, Karthik Rao M, Sagnik Dutta, Babu C, Geethaikrishnan C*
132	15:15 – 15:30	**Robust Design Optimization Using Interpretable Self-Organizing Maps** *Mohd Aman Khalid, Deepanshu Yadav, Palaniappan Ramu*
34	15:30 – 15.45	**Uncertainty Analysis and Visualization of Design Space in Higher Dimensions Using iSOM** *Naman Jain, Deepak Nagar*
87	15:45 – 16:00	**Parameter Uncertainty Analysis in Lactide Ring-Opening Polymerization: A Framework for Designing and Implementing Optimization Techniques** *Geetu P Paul, Nagajyothi Virivinti*
41	16:00 – 16:15	**Framework For Robust Design Exploration Of Composite Structures** *Niharika Balaji, Mathew Baby, Gehendra Sharma, Palaniappan Ramu, Anand Balu Nellippallil*
118	16:15 – 16:30	**Partial Discharge Analysis of Oil Cooled Transformer Using ANSYS Maxwell** *Vivek Kumar, Sarvesh Kulkarni, Vishal Pawar*

Track 4: ML/AI Driven Optimization **S4 T4** | **Hall C**

Chair: Vinay Ramanath | | Co-Chair: Eshan Amalnerkar

Paper ID	Time	Title
79	15:00 – 15:15	**Machine Learning Algorithm based Optimization in Kidney Disease Detection** *Jennifer Delighta E, Samuel GL, Santosh Varughese*
88	15:15 – 15:30	**Mathematical Modeling and Multi-Objective Optimization of Extractive Fermentation** *Srimathi Umasekar, Nagajyothi Virivinti*
95	15:30 – 15.45	**Leveraging Machine Learning for Optimization of Gasification Process across Diverse Feedstocks** *Aswitha Tadepalli, Rama Sai Anusha Manchala, Kishalay Mitra*
127	15:45 – 16:00	**Sand Casting Gating Optimization with Machine Learning Assisted Casting Simulation** *Pavan Ajay Raj, Mandyam Sridhar, A S Santhosh, S Shamasundar*

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Session 4

Track 4: ML/AI Driven Optimization S4 T4 | Hall C

Chair: Vinay Ramanath | | Co-Chair: Eshan Amalnerkar

Paper ID	Time	Title
12	16:00 – 16:15	**Generative AI and Machine learning Models Assisted Prediction of Fatigue life and Fatigue Crack Growth Behaviour of Additively Manufactured Al 2024 Alloy** *Sneha Jayaganthan, Saurabh Gairola, Jayaganthan Rengaswamy*
80	16:15 – 16:30	**Leveraging Pre-trained Transformers and Least Volume Autoencoders for High-Dimensional Bayesian Optimization** *Rosen Yu, Cyril Picard, Faez Ahmed*