Adil Rasheed

Contact Information	Elektro D/B2, 235,Gløshaugen O.S. Bragstads plass 2 Department of Engineering Cybernetics Norwegian Univeristy of Science and Technology Trondheim, Norway	*Mobile:* +47 90291771 *Website:* http://folk.ntnu.no/adil/ *Website:* www.adilrasheed.com *E-mail:* adil.rasheed@ntnu.no *Github:* www.github.com/adil-rasheed

Research Interests Digital Twin, Big Data Cybernetics, Hybrid Analysis and Modeling, Machine Learning and Artificial Intelligence, Computational Fluid Dynamics, Turbulence Modeling, Reduced Order Modeling

Research Domain Autonomous Ships/Drones/Under water vehicles, Buildings, Meteorology, Health, Wind Energy, Oil and Gas, Aviation, Aquaculture

Work Experiences

Department of Engineering Cybernetics, NTNU, Trondheim, Norway
Professor of Bigdata Cybernetics **2019 - present**
Professor II of Artificial Intelligence and Machine Learning **2018 - 2019**
Responsibilities:

- Coordination of the NTNU Digital Twin team
- Core member of the NTNU Wind Team responsible for the strategic area of renewable energy
- Core member of the NTNU Covid-19 Task force
- Establishment of the Big Data Cybernetics group
- Establishment of a new paradigm in modeling called the Hybrid Analysis and Modelling
- Acquisition and management of research projects
- Establishment of a digital twin lab
- Teaching and supervision of masters and PhD students
- Affiliated to the OpenAI lab

Mathematics and Cybernetics, SINTEF Digital, Trondheim, Norway
Research Manager of the Computational Sciences and Engineering Group **2012 - 2018**
Responsibilities:

- Design of the department's strategy geared towards digitalization
- Recruitment and grooming of researchers
- Initiations, Acquisitions, Contractual Negotiations and Management of 25+ national and international research projects
- Dissemination of scientific results to technical and non-technical audience
- Consistent satisfaction score of 5/5 in customer evaluation

Mathematics and Cybernetics, SINTEF Digital, Trondheim, Norway
Senior Scientist in the Computational Sciences and Engineering Group **2012 - present**
Responsibilities:

- Development of a new modeling paradigm called the Hybrid Analysis and Modeling (HAM) and establishment of four projects around the topic since 2018
- Bridging the gap between academic research and industrial needs through the development of Reduced Order Modeling (ROM) algorithms
- Was one of the four key members of the Big-Learning initiative within SINTEF designing a roadmap for SINTEF geared towards digitalization
- Recruitment of the researchers in Computational Sciences and Engineering and Analytics and Artificial Intelligence groups

- Member of the Center of Excellence for Artificial Intelligence within the Mathematics and Cybernetics Department

Department of Applied Mathematics, SINTEF ICT, Trondheim, Norway
Research Scientist in the Trondheim Simulation Group **2009-2012**
Responsibilities:
- Software Development
- Analysis of results from numerical simulations and report compilation
- Conduction of Computational Fluid Dynamics and Structural Mechanics simulations
- Solid Modeling and Mesh Generation

Meteorology and Climatology Group, University of Tsukuba, Tsukuba, Japan
Visiting Scientist **2009-2012**
Responsibilities:
- Establishment of collaboration with the center which enabled the use of their computing facilities
- Joint research on data analysis and numerical analysis relevant for atmospheric flows and wind energy

Laboratory of Solar Energy and Building Physics, EPFL, Lausanne, Switzerland
Doctoral Assistant **2005-2009**
Responsibilities:
- Teaching of courses on Building Physics
- Supervision of graduate and undergraduate students in their project works

Induslogic Pvt. Ltd., Noida, India
Associate Engineer **July-Aug 2005**

Education

Swiss Federal Institute of Technology, Lausanne, Switzerland **2005-2009**
School of Architecture, Civil and Environmental Engineering

PhD. in Numerical Modelling of Urban Climate

Indian Institute of Technology Bombay, Mumbai, India **2000-2005**
Department of Mechanical Engineering

Master of Technology in Thermal and Fluids Engineering

Indian Institute of Technology Bombay, Mumbai, India **2000-2005**
Department of Mechanical Engineering

Bachelor of Technology in Mechanical Engineering

Courses Taught

- TTK4260: Introduction to Multivariate Data Analysis
- TTK8117: Advanced Multivariate Data Analysis
- TTK29: Hybrid Analysis and Modeling for Digital Twins
- TTK4853: Virtual Reality based Digital Twins, 2023
- TTK4853: Experts in Team: Explainable Artificial Intelligence, 2021
- TTK4853: Hybrid Modeling for Digital Twins, 2020

- Geilo WInter School, Practical Machine Learning, 2017
- Short Course Series: Mathematics of Porous Media, Hybrid Analysis and Modeling, 2021

PROJECTS

BigPressure

dThor-Digital Ship Structural Health Monitoring

Highly capable digital twin **2022-2023**
Client: RCN
Research area: Digital Twin, Internet of Things, Hybrid Analysis and Modeling

PERSEUS, PhD supervision **2023-2026**
Client: RCN, H2020
Research area: Digital twin for futuristic urban mobility solution

PoroTwin, Researcher **3.6MNOK, 2021-2025**
Client: Wintershell
Research area: Building a digital twin of porous media flow

Hole Cleaning Monitoring, Work Package Manager, PhD supervision **16MNOK, 2021-2025**
Client: RCN, Vår Energi and AkerBP, TDE Norge
Research area: Hole cleaning monitoring in drilling with distributed sensors and hybrid methods

PERSEUS, PhD supervision **2022-2025**
Client: RCN, H2020
Research area: Digital twin for autonomous surface vehicles

NorthWind, Work Package Manager, PhD supervision **320MNOK, 2021-2028**
Client: RCN, Numerous Industry partners
Research area: Digital twin for Wind Farms

RAPID, Researcher **10MNOK, 2020-2023**
Client: RCN, DNVGL, Dt. Tech Olav Olsen
Research area: Hybrid analysis and modeling

SFI Autoship, PhD supervision **240MNOK, 2020-2023**
Client: RCN, Several industry partners
Research area: Situational awareness

EXAIGON, WP Manager and PhD supervision **16MNOK, 2020-2023**
Client: RCN, Several industry partners
Research area: Explainable machine learning

CONWIND, PostDoc Co-supervision **25MNOK, 2020-2024**
Client: RCN, Norway-Chine research collaboration
Research area: Reduced order modeling of wakes

Autosit, WP Manager and PostDoc supervision **12MNOK, 2019-2022**
Client: RCN, Kongsberg, DNV GL, Marine Robotics
Research area: Long term trajectory prediction for autonomous ships

Lofoten airport citing, Investigator **900kNOK, 2018-2019**
Client: KVT
Research area: Citing of an optimal location for a proposed airport in the Lofoten region

SOLA Special Analysis- Phase II, Project Manager 500kNOK, Dec 2018-
Client: Sømmvågen III AS

Research Area: Building induced turbulence, Aerodynamic buildings, Architecture

Fluoro Special Analysis, Researcher and Quality Assurance **300kNOK, 2018-2018**
Client: Forsvarsbygg
Research area: Investigation of the impact of a proposed hanger on the flying conditions at the Florø airport

Air Transport of Blood, Work Package Manager **1.2MNOK, 2018-2021**
Client: Norwegian Research Council (HELSEVEL)
Research Partners: FFI, MET, Intervention Center
Research area: Aerial Transport of Biological material between hospitals

DIGIMOB, Work Package Manager **800kNOK, 2018-2021**
Client: Norwegian Research Council (TRANSPORT 2025)
Research area: Digitalisation and mobility (DIGMOB): Smart and sustainable transport in urban agglomerations

Hybrid Analytics, Project Manager **2MNOK, 2018**
Client: SINTEF
Research area: Combining physics-driven and data-driven models

POP-SEP MLFunc, Researcher **150kNOK, 2017**
Client: SINTEF
Research area: Predicting the thermoelectric behavior of new chemical molecules using Machine Learning

E8, Proposal Writing, **100kNOK, 2017**
Client: Statens Vegvesen
Research area: Towards Designing Intelligent Transport Solutions

BIGLEARN, Project Manager **600kNOK, 2017**
Client: SINTEF
– Serve as one of the four core members of the BIGLEARN initiative within SINTEF designing a roadmap geared towards digitization
– Instructional work on Machine Learning for SINTEF employees.

AI-CLIMAMOB, Researcher **350kNOK, 2017**
Client: TØI
– Quantify the impact of climate on urban mobility and develop Machine Learning Algorithms to predict number of pedestrians and vehicles on a stretch of road at a particular instance of time.

ANALYTICS TECHNOLOGY WATCH, Project Manager **1mNOK, 2017**
Client: Kongsberg
– Help the client improve and use their Artificial Intelligence and Machine Learning technology platform as a competitive edge in the new age of digitalization and design its future value propositions.

ESUSHI, Quality Assurance **200kNOK, 2016**
Client: SINTEF ICT
– Analysis of the complicated relationship between meteorological data, oceanographic biomarkers (algae, planktons etc.) and fish catch reports (species caught, equipment used etc.).

E3WDM, Quality Assurance **300kNOK, 20176**
Client:SINTEF
– Clustering of time series based on graph weighted by correlation revealing underlying structure.

Automatic anomaly detection in sensor data.

OPWIND, Work Package Manager **7mNOK, 2017-2020**
Client: Norwegian Research Council, Statoil and Vattenfall (ENERGIX)
Research Partners: SINTEF Energy, SINTEF Digital, Norwegian Meteorological Institute, NTNU
International Partners: NREL, DTU
Research Area: Real time control system for wind farms, Aerodynamics, Reduced Order Modelling

E39, Task Manager **600kNOK, Jan 2017-**
Client: Norwegian Meteorological Institute, Vegvesen
Research partners: Wind in complex terrain and fjord relevant for bridge designs and road transport.

FSI-WT (Fluid Structure Interaction for Wind Turbine), Work Package Manager **20mNOK, 2012- 2017**
Client: Norwegian Research Council, Statoil, Trønderenergie, WindSIM, Kjeller Vindteknik
Research Partners: SINTEF ICT, NTNU, FFI, Norwegian Meteorological Institute
Research Area: Fluid Structure Interaction, Aerodynamics, Power Forecasting, Ocean-MET interactions, Wake-terrain-turbine-atmosphere interaction modelling

NOWITECH, Task Manager **4mNOK, 2009-2017**
Client: Norwegian Research Council, Statoil, Statkraft, DNV, Dong, CD-ADAPCO
Research Partners: NTNU, SINTEF ICT, SINTEF Energy, MARINTEK, IFE
Research Area: Numerical Methods for Wind Energy, Isogeometric Analysis, Computational Fluid Dynamics, New turbine concepts

URBASIM, Project Manager **1.5mNOK, Jan-Dec 2016**
Client: Norwegian Research Council
Research Area: Wind Energy in an Urban context, Building refurbishment, Air conditioning, Urban Geometry Modelling, Aerodynamic Buildings, 3D printing and scanning, Urban Climatology

DRIFT TURBULENS, Project Manager **12mNOK, 2010-**
Client: Norwegian Meteorological Institute & Avinor
Research Area: Aviation, Atmospheric turbulence, Microscale wind and turbulence prediction system

SOLA Special Analysis, Project Manager **600kNOK, Nov 2016-**
Client: Sømmvågen III AS
Research Area: Building induced turbulence, Aerodynamic buildings, Architecture

EXTBUILDFLOW, Project Manager **1.5mNOK, Jan-Dec 2015**
Client: Norwegian Research Council
Research Area: Urban Geometry Modelling, Computational Fluid Dynamics, Turbulence Modelling

NEST: Thermal Heat Storage, Quality Assurer **500kNOK, 2014-2015**
Client: NEST
Research Area: Thermal heat storage, thermal stresses induced fracture modeling, design optimization

SESAR (Single European Sky Air traffic management Research), Researcher **12mNOK, 2010-2016**
Client: Euro Control
Research Area: Aircraft wakes, Aviation Safety, Vortex Particle Method

Avinor FoU, Project Manager **5.2mNOK, 2010-2013**
Client: Avinor

Research area: Aviation safety, Atmospheric Turbulence Modelling

BUILDSIM, Project Manager **275kNOK, Jan-March 2015**
Client: FG Eiendom

DAEDALUS, Task Manager **275kNOK, Jan-Dec 2015**
Client: European Space Agency
Research partners: Satavia, Catapult, Avinor ANS, NCAR, UiO
Research area: Atmospheric turbulence, Sensor integration in aircraft

Bodø Special Analysis, Project Manager, **200kNOK, Feb-March 2016**
Gimsøya Airport Siting, Project Manager, **300kNOK, Nov 2015-Dec 2016**
Sandane Special Analysis, Project Manager, **150kNOK, Dec 2016-**
Ørsta Volda Special Analysis, Project Manager, **150kNOK, Dec 2016-**
Sola Special Analysis, Project Manager, **300kNOK, Jan-Dec 2015**
Flesland Harbour Analysis, Project Manager, **250kNOK, June-Sep 2010**
Faroe Island Airport Siting, Project Manager, **250kNOK, 2010-2010**
Stokka Airport runway siting, Project Manager, **150kNOK**
Kjevik Speial Analysis, Project Manager, 150kNOK **150kNOK**
Alta Special Analysis, Project Manager, 150kNOK **150kNOK**
Haugesund Special Analysis, Project Manager, 150kNOK **150kNOK**

Administrative Duties

- ECCOMASS 2022 Congress, Organizing committee
- Organization of the CSAI conference 2021
- Special session on Explainable AI, HAM
- Coordinator of the NTNU Team Digital Twin
- Member of the NTNU Team Wind
- Member of the NTNU COVID-19 task force
- Member of the Center of Excellence for Artificial Intelligence within the Mathematics and Cybernetics Department
- Steering Committee member of the OPWIND project
- Member of the Monitoring Commission to oversee the implementation of the study in the French medical project titled: "*Etude des facteurs génétiques et environnementaux de vulnérabilité aux troubles bipolaires*"
- Member of the International Scientific Committee, International Conference on Computing Mathematics and Statistics, 2015, Malaysia
- Member of the Advisory Committee, Three days international workshop on OpenFoam-Application and Development, 2013, organized by the Department of Mechanical Engineering, University of Pune
- Occasional reviewer of research proposals at the Norwegian Research Council
- Editorial board member for the journal Climate the Journal Innovative Energy Policies
- Reviewer for the Applied Energy, Journal of Wind Engineering and Industrial Aerodynamics
- Representation of Norway in the Wakebench Task 31
- Strategy design for the Mathematics and Cybernetics Department of SINTEF Digital
- Establishment of a new group on Artificial Intelligence
- Representation of SINTEF in European Energy Research Alliance (EERA)
- Reviewed papers in the OMAE 2014, OMAE 2017
- Organizing committee of CISBAT, a biennial International Conference organized by the Laboratory of Solar Energy and Building Physics, EPFL

Honors and Awards

– Best Masters thesis in automation from NFEA, 2023 – Runner up best masters theis award 2023 from the Open AI Lab – Best Masters thesis award 2022 from BaneNOR
– Best Masters thesis award 2022 from the OpenAI lab
– Best Masters thesis award 2021 from the OpenAI lab
– Runner up best masters thesis award 2021 from the Open AI Lab
– PhD Theis was nominated for the *Ville de Lausanne* Award
– National Science Foundation, PNR 41 Doctoral Dissertation Research
– Institute Merit-Cum-Means Scholarship 2000-2005
– Certificate of Merit for being the top 0.1% of the students appearing in the Matriculation exam all over India
– Institute Cultural Color award for the contribution to the cultural scene of IIT Bombay
– Special Mention for the contribution to the Performing Arts Festival 2002 and 2005 of IIT Bombay
– Best Office Bearer award for the contribution as the Photography and Fine Arts Secretary
– More than 30 awards in fine arts ranging from district to national level

JOURNAL

J1 Berg, H.S., Menges, D., Tengesdal, T., Rasheed, A., Digital Twin Syncing for Autonomous Surface Vessels Using Reinforcement Learning and Nonlinear Model Predictive Control

J2 Belay, M.A., Rasheed, A., Rossi, P.S., Sparse Non-Linear Vector Autoregressive Networks for Multivariate Time Series Anomaly Detection

J3 Wismadi, T., Frøyen, Y.K., Rasheed, A., Towards the adoption of active travel in environmentally challenged areas: A systematic literature review

J4 Morkunaite, L., Rasheed, A., Pupeikis, D., Angelakis, V., Davidsson, T., Optimizing Buildings' thermal performance with Digital Twins: A New Approach to Thermal Zoning for Model Predictive Control, Submitted

J5 Zhang, W., Vatn, J., Rasheed, A., Predictive maintenance scheduling for stochastic hybrid system: A case study of an offshore wind farm, Submitted to Reliability Engineering & System Safety

J6 Zhang, W., Vatn, J., Rasheed, A., A differential evolution based approach for short-term predictive maintenance scheduling of an offshore wind turbine, Submitted to Reliability Engineering & System Safety

J7 von Brandis, A., Menges, D., Rasheed, A., Multi-Target Tracking for Autonomous Surface Vessels Using LiDAR and AIS Data Integration, Submitted

J8 Fonn, E., Brummelen, H., Eftang, J.L., Rusten, T., Johannessen, K.A., Kvamsdal, T. and Rasheed, A, Least-squares projected models for non-intrusive affinization of Reduced Basis Methods, Submitted

J9 Zhang, W., Vatn, J., Rasheed, A., Gearbox pump failure prognosis in offshore wind turbine by an integrated data-driven model, Submitted to Applied Energy

J10 Menges, D., Rasheed, A., Real-Time Predictive Condition Monitoring Using Multivariate Data, IEEE Transactions on Image Processing

J11 Belay, M.A., Rasheed, A., Rossi, P.S., PMultivariate Time Series Anomaly Detection via Low-Rank and Sparse Decomposition, IEEE Sensors

J12 Alshantti, A., Rasheed, A., Westad, F., Privacy Re-identification Attacks on Tabular GANs, Security and Privacy, 2024

J13 Stadtman, F., Furevik, E., Rasheed, A., Kvamsdal, T., Physics-guided federated learning as an enabler for digital twin, *Expert System with Applications*, 125169, 2024

J14 Wold, J.W, Stadtmann, F., Rasheed, A., Tabib, M., San, O., Horn, J., Enhancing wind field resolution in complex terrain through a knowledge-driven machine learning approach, *Engineering Applications of Artificial Intelligence*, 137A, 109167, 2024

J15 Vaaler, A., Husa, S., Menges, D., Nakken, T.L., Rasheed, A., Modular Control Architecture for Safe Marine Navigation: Reinforcement Learning and Predictive Safety Filters, *Artificial Intelligence*, 336, 104201, 2024

J16 Gupta, P., Rasheed, A., Steen, S. Correlation-based outlier detection for ships' in-service datasets, *Journal of Big Data*, 11,85, 2024

J17 Belay, M.A., Rasheed, A., Rossi, P.S., MTAD: Multi-Objective Transformer Network for Unsupervised Multi-Sensor Anomaly Detection, *IEEE Sensor Journal*,24, 12, 20254-20265, 2024

J18 Altindal, M.C. Nivlet, P. Tabib, M.V., Rasheed, A., Kristiansen, T.G., Khosravanian, R., Anomaly detection in multivariate time series of drilling data, *Geoenergy Science and Engineering*, 212778, 2024

J19 Føre., M., Alver, M.O., Alfredsen, J.A., Rasheed, A., Hukkelås, T., Bjelland, H.V., Su, B., Ohrem, S.J., Kelasidi, E., Norton, T., Papandroulakis, N., Digital twins in intensive aquaculture - Challenges, opportunities and future prospects, *Computers and Electronics in Agriculture*, 218, 108676, 2024

J20 Alshantti, A. Varagnolo, D., Rasheed, A., Rahmati, A., Westad, F., CasTGAN: Cascaded Generative Adversarial Network for Realistic Tabular Data Synthesis, *IEEE Access*, 12, 13213–13232, 2024

J21 Keilegavlen, E., Fonn, E., Johannessen, K., Eikehaug, K., Both, J.W., Fernø, M., Kvamsdal, T., Rasheed, A., Nordbotten, J.M., PoroTwin: A Digital Twin for a FluidFlower Rig, *Transport in Porous Media*, 151, 1241–1260 2024

J22 Sørbø, S., Blakseth, S.S., Rasheed, A., Kvamsdal, T., San, O., Enhancing Elasticity Models with Deep Learning: A Novel Corrective Source Term Approach for Accurate Predictions, *Applied Soft Computing*, 111312, 2024

J23 Haugstvedt, E.J., Calero, A.M., Lundby, E.T.B., Rasheed, Gravdahl, J. T., A Comparative Study of Sparsity Promoting Techniques in Neural Network for Modeling Non-Linear Dynamics, *IEEE Access*, 11, 131435–131452, 2023

J24 San, O., Pawar, S., Rasheed, A. Decentralized digital twins of complex dynamical systems. *Scientific Reports* 13, 20087, 2023

J25 Stadtmann, F., Rasheed A., Kvamsdal, T., Johannessen, K.A., San, O., Kölle, K, Tande, J.O., Barstad, I., Benhamou, A., Brathaug, T., Christiansen, T., Firle, A.L., Fjeldly, A., Frøyd, L., Gleim, A., Høiberget, A., Meissner, C., Nygård, G., Olsen, J., Paulshus, H., Rasmussen, T., Rishoff, E., Scibilia, F., Skogås,J.O., Digital Twins in Wind Energy: Emerging Technologies and Industry-Informed Future Directions, *IEEE Access*, 11, 110762-110795, 2023

J26 Menges, D., Rasheed, A., An Environmental Disturbances Observer Framework for Autonomous Ships, *Ocean Engineering*, 285, 115412, 2023

J27 Midjiyawa, Z., Venås, J.V., Kvamsdal, T., Kvarving, A.M., Midtbø, K.H., Rasheed, A., Nested computational fluid dynamic modeling of mean turbulent quantities estimation in complex topography using AROME-SIMRA, *Journal of Wind Energy and Industrial Aerodynamics*, 240, 105497, 2023

J28 Gupta, P., Kim, Y., Steen, S., Rasheed, A., Streamlined Semi-automatic Data Processing Framework for Ship Performance Analysis, *International Journal of Naval Architecture and Ocean Engineering*, 100550, 2023

J29 Belay, M. A., Blakseth, S.s., Rasheed, A., Salvo Rossi, P., Unsupervised Anomaly Detection for IoT-Based Multivariate Time Series: Existing Solutions, Performance Analysis and Future Directions, *Sensors*, 23(5), 2844, 2023

J30 Elfarri, E.M., Rasheed, A., San, O., Artificial Intelligence-Driven Digital Twin of a Modern House Demonstrated in Virtual Reality, *IEEE Access*, 11, 35035-35058, 2023

J31 Robinson, H., Lundby, E.T.B., Rasheed, A., Gravdahl, J.T., Deep learning assisted physics-based modeling of aluminum extraction process. Engineering Applications of Artificial Intelligence 2023, 125 (106623)

J32 Lundby, E.T.B., Rasheed, A., Gravdahl, J.T., Halvorsen, I.J., Sparse deep neural networks for modeling aluminum electrolysis dynamics, *Applied Soft Computing*, 134, 109989, 2023

J33 Ahmed, S.E., San, O., Rasheed, A., Iliescu, T., Veneziani, A., Physics Guided Machine Learning for Variational Multiscale Reduced Order Modeling, *SIAM Journal on Scientific Computing*, 45(3), 283-313, 2023.

J34 Pawar, S., San, O., Rasheed, A., Frame-invariant neural network closures for Kraichnan turbulence, *Physica A: Statistical Mechanics and its Applications*, 609, 128327, 2023.

J35 San. O., Pawar, S., Rasheed, A., Variational multiscale reinforcement learning for discovering reduced order closure models of nonlinear spatiotemporal transport systems, *Scientific Report* 12, 17947 (2022)

J36 Blakseth, S.S., Rasheed, A., Kvamsdal, T. and San, O., Combining physics-based and data-driven techniques for reliable hybrid analysis and modeling using the corrective source term approach, *Applied Soft Computing*, 128, 109533, 2022

J37 Robinson H., Pawar, S., Rasheed, A., San, O., Physics guided neural networks for modelling of non-linear dynamics, *Neural Networks*, 154, 333-345, 2022

J38 Heiberg, A., Larsen, T.N., Meyer, E., Rasheed, A., San, O., Varagnolo, D., Risk-based implementation of COLREGs for autonomous surface vehicles using deep reinforcement learning, *Neural Networks*, 152, 17-33, 2022

J39 San, O., Pawar, S., Rasheed, A., Prospects of federated machine learning in fluid dynamics. AIP Advances, 12, 095212, 2022

J40 Gupta, P., Rasheed, A., Steen, S., Ship Performance Monitoring using machine-learning, *Ocean Engineering*, 254, 111094, 2022

J41 Pawar, S., San, O., Vedula, P., Rasheed, A., Kvamsdal, T., Multi-fidelity information fusion with concatenated neural networks, *Scientific Report*, 12, 5900, 2022

J42 Blakseth, S.S., Rasheed, A., Kvamsdal, T., San, O. Deep neural network enabled corrective source term approach to hybrid analysis and modeling, *Neural Networks*, 146, 181-199, 2021

J43 Alshantti, A.A.S., Rasheed, A. Self-organising map based framework for investigating accounts suspected of money laundering, *Frontiers in Artificial Intelligence*, 2021

J44 Ahmed, S. E., San, O., Rasheed, A. and Iliescu, T. Nonlinear proper orthogonal decomposition for convection-dominated flows, *Physics of Fluids*, 33, 121702, 2021.

J45 Larsen, T.N., Teigen, H.Ø., Laache, T., Varagnolo, D., and Rasheed, A., Comparing Deep Reinforcement Learning Algorithms' Ability to Safely Navigate Challenging Waters, *Frontiers in Robotics and Artificial Intelligence*, 8, 287, 2021

J46 Lundby, E.T.B., Rasheed, A., Gravdahl, J.T., Halvorsen, I.J., A novel hybrid analysis and modeling approach applied to aluminum electrolysis process, *Journal of Process Control*, 105, 62–77, 2021.

J47 Gupta, P., Taskar, B., Steen, S., Rasheed, A., Statistical modeling of Ship's hydrodynamic performance indicator, *Applied Ocean Research*, 111, 102623, 2021.

J48 Ahmed, S., Pawar, S., San, O., Rasheed, A., Iliescu, T., and Noack, B., On closures for reduced order models - a spectrum of first-principle to machine-learned avenues, *Physics of Fluids*, 33, 091301, 2021.

J49 Pawar, S., San, O., Rasheed, A., Navon, I.M., A nonintrusive hybrid neural-physics modeling of incomplete dynamical systems: Lorenz equations, *International Journal of Geomathematics*, 12, 17, 2021

J50 Pawar, S., San, O., Aditya, N., Rasheed, A., Kvamsdal, T., Model fusion with physics-guided machine learning: projection based reduced order modeling, *Physics of Fluids*, 33, 067123, 2021. **(Editor's Pick)**

J51 San, O., Rasheed, A., Kvamsdal, T. Hybrid analysis and modeling, eclecticism, and multifidelity computing toward digital twin revolution, *GAMM Mitteilungen*, 44, e202100007, 2021.

J52 Sundby, T., Graham, J. M., Rasheed, A., Tabib, M., San, O., Geometric change detection in digital twins, *Digital*, 1 (2), 111-129, 2021.

J53 Ahmed, S. E., Pawar, S., San, O., Rasheed, A., Tabib, M., A nudged hybrid analysis and modeling approach for realtime wake-vortex transport and decay prediction, *Computers and Fluids*, 221, 104895, 2021.

J54 Stavelin, H., Rasheed, A., San, O., Hestnes, A. J., Applying object detection to marine data and exploring explainability of a fully convolutional neural network using principal component analysis, *Ecological Informatics*, 62, 101269, 2021.

J55 Ahmed, S. E., San, O., Kara, K., Younis, R., Rasheed, A., Multifidelity computing for coupling full and reduced order models, *PLOS ONE*, 16(2), e0246092, 2021.

J56 Havenstrøm, S. T., Rasheed, A., San, O. Deep reinforcement learning controller for 3D path following and collision avoidance by autonomous underwater vehicles, *Frontiers in Robotics and AI*, 7, 566037, 2021.

J57 Pawar, S., San, O., Aksoylu, B., Rasheed, A., Kvamsdal, T. Physics guided machine learning using simplified theories, *Physics of Fluids*, 33, 011701, 2021.

J58 Ahmed, S. E., San, O., Kara, K., Younis, R., Rasheed, A., Interface learning of multiphysics and multiscale systems, *Physical Review E*, 102, 053304, 2020.

J59 Ahmed, S. E., Bhar, K., San, O., Rasheed, A. Forward sensitivity approach for estimating eddy viscosity closures in nonlinear model reduction, *Physical Review E*, 102, 043302, 2020.

J60 Meyer, E., Heiberg, A., Rasheed, A., San, O., COLREG-Compliant Collision Avoidance for Unmanned Surface Vehicle using Deep Reinforcement Learning, *IEEE Access*, 8, 165344-165364, 2020.

J61 Pawar, S., Ahmed, S. E., San, O., Rasheed, A., Navon I. M., Long short-term memory embedded nudging schemes for nonlinear data assimilation of geophysical flows, *Physics of Fluids*, 32, 076606, 2020.

J62 Pawar, S., Ahmed, S. E., San, O., Rasheed, A. An evolve-then-correct reduced order model for hidden fluid dynamics, *Mathematics*, 8(4), 570, 2020.

J63 Ahmed, S. E., San, O., Rasheed, A., Iliescu, T., A long short-term memory embedding for hybrid uplifted reduced order models, *Physica D: Nonlinear Phenomena*, 409, 132471, 2020.

J64 Pawar, S., Ahmed, S. E., San, O., Rasheed, A., Data-driven recovery of hidden physics in reduced order modeling of fluid flows, *Physics of Fluids*, 32, 036602, 2020.

J65 Meyer, E., Robinson, H., Rasheed, A., San, O., Taming an autonomous surface vehicle for path following and collision avoidance using deep reinforcement learning, *IEEE Access*, 8, 41466-41481, 2020.

J66 Rasheed, A., San, O., Kvamsdal, T., Digital twin: values, challenges and enablers from a modeling perspective, *IEEE Access*, 8, 21980-22012, 2020.

J67 Pawar, S., San, O., Rasheed, A., Vedula, P., A priori analysis on deep learning of subgrid-scale parameterizations for Kraichnan turbulence, *Theoretical and Computational Fluid Dynamics*, 34, 429-455, 2020.

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OP10 Shabnam A, **Rasheed A**, *Investigation of the influence of 5-HT1A R agonist and 5-HT2A/2C R agonist in m-RNA expression of AMPA-R GABA-Aα 1R and BDNF in HT-22 cells of mice*, 4th International Conference and Exhibition on Biometrics and Biostatistics, San Antonio, USA,

Abstract published in The Journal of Applied & Computational Mathematics, ISSN: 2168-9679, DOI: 10.4172/2168-9679.C1.002

OP11 Rasheed A, *Empirical Model Decomposition based mathematical modelling strategy for analyzing Actigraphy Data and correlating it to Clinical Psychiatric Evaluation*, Actigraphy Conference, Trondheim, Norway, 2016

OP12 Kvarving AM, Kvamsdal K, Okstad KM, Mathisen KM, Fonn E, Johannessen KA, Rasheed A and Holdahl R, *IFEM - an isogeometric toolbox for the solution of PDEs, III International Conference on Isogeometric Analysis*, June 2015, Trondheim, Norway, ISBN : 978-84- 943928-5-6

OP13 Tabib M, Rasheed A, Kvamsdal T, *Simulation of the on-shore Bessaker wind farm: Analyzing terrain and wake effects on the wind farm performance*, Wake Conference, 2015

OP14 Opstal Tv, Fonn E, Kvamsdal T, Kvarving AM, Mathisen KM, Nordanger K, Okstad KM, Rasheed A, and Tabib M, *FSI of wind turbine blades*, VI International Conference on Coupled Problems in Science and Engineering, Venice, 2015

OP15 Kvamsdal T, Fonn E, Kvarving AM, Mathisen KM, Nordanger K, Okstad KM, Opstal Tv, Rasheed A, and Tabib M, *Strip theory approach for FSI of offshore wind turbine blades*, VI International Conference on Coupled Problems in Science and Engineering, Venice, 2015

OP16 Rasheed A, Sørli K, Kvamsdal T, *Application of a Multiscale Turbulence Prediction System for aviation safety and wind turbine siting*, 6th European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS 2012), Austria, September 10-14, 2012

OP17 Rasheed A, Sørli K, Ødegaard V, Kvamsdal T, Midtbø H, *Potential of Numerical Turbulence Prediction System for Wind Turbine Micrositing*, International Conference on Renewable Energy Utilization, Coimbatore, India, 2012

OP18 Kvarving AM, Holdahl R, Kvamsdal T, Rasheed A, *Isogeometric 2-D CFD Simulations of Turbulent Flow around Bluff Bodies*, US National Conference of Computational Mechanics, 2011

OP19 Rasheed A, Sørli K, Holdahl R, Kvamsdal T, *A Multiscale Approach to Micrositing of Wind Turbines*, International Conference on Advances in Energy Engineering, Bangkok 2011

OP20 Rasheed A, *Multiscale Modelling of Urban Climate*, 1st Swiss Building and Urban Simulation Conference, Lucerne, Switzerland 2009

OP21 Rasheed A, Nandi K, Date AW, *A Novel Experimental Set-up for Investigation of Perfect Mixing and Perfect Displacement Models for the scavenging process in a Cavity*, 7th World Conference on Experimental Heat Transfer, Fluid Mechanics and Thermodynamics 2009, Krakow, Poland

OP22 Blond N, Belalcazar LC, Rasheed A, Clappier A, Huttner S, Bruse M, *Design and Test of a System to Simulate Road Traffic Emissions*, Annales de ILSUP 2008

OP23 Rasheed A, Robinson D, Clappier A, *Investigation of the nature of the dispersive fluxes in Urban Parametrization using Large Eddy Simulation*, 2008, Annual Meeting, Boston, Massachusetts

OP24 Robinson D, Filchakova N, Kaempf J, Rasheed A, Scartezzini JL, *Towards an evolutionary model of city sustainability* in Holcim Forum, Beijing, 2007

POSTER

P1 Siddiqui MS, Rasheed A, Kvamsdal T*Reduced Order Modeling of lift characteristics of NACA0015 using van der Pol equation*, Deep Wind 2018

P2 Fonn E, Brummelen Hv, Kvamsdal T, Rasheed A, Siddiqui MS, *Fast divergence-conforming reduced order models for flow*, Deep Wind 2018

P3 Fonn E, Rasheed A, Tabib M, Kvamsdal T, Siddiqui MS, Kvarving AM, Okstad KM, *Torturing data with artificial intelligence*, Departmental meet 2017

P4 Rasheed A, Tabib M, Fonn E, Kvamsdal T, Siddiqui MS, Kvarving AM, Fuchs F, Okstad KM, *Gone with the wind*, Departmental meet 2017

P5 Kvamsdal T, Johannessen KA, Kvarving AM, Okstad KM, Fonn E, Rasheed A, Tabib M, *AFES: Autonomous Finite Element Simulation*, Departmental meet 2017

P6 Kvarving AM, Kvamsdal T, Rasheed A, Okstad KM, Fonn E, Mathisen KM, Nordanger K, Opstal Tv, Tabib M, *3D CFD and FSI-simulation of flow around turbine blades*, 12th Deep Sea Offshore Wind R&D Conference, Deepwind 2015

P7 Okstad KM, Mathisen KM, Kvamsdal T, Kvarving AM, Nordanger K, Rasheed A, Tabib M, Fonn E, Opstal Tv, *3D Beam element for FSI-simulation of flow around turbine blades*, 12th Deep Sea Offshore Wind R&D Conference, Deepwind 2015

P8 Nordanger K, Kvamsdal T, Kvarving AM, Mathisen KM, Okstad KM, Rasheed A, Fonn E, Opstal Tv, Tabib M, *Strip theory approach for FSI-simulation of flow around turbine blades*, 12th Deep Sea Offshore Wind R&D Conference, Deepwind 2015

P9 Siddiqui MS, Rasheed A, Kvamsdal T, Tabib M, *Three Dimensional Variable Turbulent Intensity Flow Field Characterization of a Vertical Axis Wind Turbine*, 12th Deep Sea Offshore Wind R&D Conference, Deepwind 2015

P10 Opstal TV, Fonn E, Kvamsdal T, Kvarving AM, Mathisen KM, Nordanger K, Okstad KM, Rasheed A, Tabib M, *Isogeometric methods for CFD and FSI-simulation of flow around turbine blades*, 12th Deep Sea Offshore Wind R&D Conference, Deepwind 2015

P11 Fonn E, Rasheed A, Kvarving AM and Kvamsdal T, *Spline based Mesh Generator for high fidelity simulation of flow around turbine blades*, 12th Deep Sea Offshore Wind R&D Conference, Deepwind 2015

P12 Tabib M and Rasheed A, *Investigation of the impact of wakes and stratification on the performance of an onshore wind farm*, 12th Deep Sea Offshore Wind R&D Conference, Deepwind 2015

P13 Mushtaq A, Rasheed A, Kvamsdal T, Tabib M, *Statistical Analysis of wind mast data from the Bessaker Wind Farm*, 12th Deep Sea Offshore Wind R&D Conference, Deepwind 2015

P14 Süld JK, Rasheed A, Sætra Ø, Carasco A, Kristiansen J, Kvamsdal T, *Mesoscale Numerical Modelling of Met-Ocean Interactions*, 12th Deep Sea Offshore Wind R&D Conference, Deepwind 2015

P15 Süld JK, Midtbø KH, Kristiansen J, Rasheed A, Kvamsdal T, *Wind turbine power production forecasting and design methodology*, The World Weather Open Science Conference, Montreal, Canada, 2014

P16 Nordanger K, Kvamsdal T, Holdahl R, Kvarving AM, Rasheed A, *Simulation of flow past a NACA0015 airfoil using an isogeometric incompressible Navier-Stokes solver*, NOWITECH Day, Trondheim 2014

P17 Åkervik E, Rasheed A, Holdahl R, *FSI: Fluid Solid Interaction for Wind Turbine*, Poster presentation in the 11th Deep Sea Offshore Wind R&D Conference, Deep Wind 2014

P18 Rasheed A, Süld JK, Kvamsdal T, *A Multiscale Wind and Power Forecast System for Wind Farms*, Poster presentation in the 11th Deep Sea Offshore Wind R&D Conference, Deep Wind 2014

P19 Rasheed A, Holdahl R, Kvarving AM, Süld JK, *Fluid Structure Interaction for Wind Turbines*, NOWITECH Day, Trondheim, 2013

Invited Talks

IT1 Panel Discussion on Trustworthy AI for Sustainable Marine and Offshore Systems, OMAE 2024, Singapore

IT2 Digital Twins in Wind Energy, 5th Edition Windpower Data and Digital Innovation Forum, 2024, Berlin

IT3 Digital twinning of autonomous systems, CSAI 2023

IT4 Big data cybernetics, Data Day 2023

IT5 Hybrid Analysis and Modeling as an enabler for Big Data Cybernetics, OpenAI Lab, 2020

IT6 Hybrid Analysis and Modeling as an enabler for Big Data Cybernetics, Tekna Big Data Symposium, 2019

IT7 Hybrid Analysis and Modeling as an enabler for Big Data Cybernetics, Keynote Talk at the Nordic Seminar in Computational Mechanics, 2019

IT8 *Industry performance enhancement using Hybrid Analytics*, SINTEF Petroleum Conference, Trondheim, 2018 *Use of hybrid analytics methods to decide on drone landing and take-off platforms in urban areas*, Drones within the healthcare sector, Drone Conference, June 2018

IT9 *Hybrid-Analytics: An enabling technology*, Kongsberg Maritime, Hortem,KOngsberg, Asker 2018

IT10 *Hybrid-Analytics: Trends and looking forward with emphasis on Deep Learning*, Kongsberg Technology Forum, Oslo, 2017

IT11 *Hybrid-Analytics: Trends and looking forward*, Kongsberg Technology Forum, Sundvolden, 2017

IT12 *Wind Energy Modelling from a Wind Farm to a Wind Blade Scale / Recent Innovations in Wind Engineering in Norway and Potential for Collaborations*, Invited Talk at the Tsukuba Science Week 2016, Tsukuba, Japan

IT13 *Flow modeling and pollutant transport in an urban area*, 2015, Trondheim Kommune,

IT14 *Dealing with the complexities in urban geometry in Mesoscale Modeling of Urban Climate*, 2014, Meteorology and Climatology Group, University of Tsukuba, Japan,

IT15 *Multiscale Wind and Temperature Modeling*, Plenary talk at the Parallel CFD 2014 Conference, Trondheim Norway

IT16 *Norwegian Offshore Wind Technology: NOWITECH project*, Indo-Norwegian workshop on Renewable Energy, Mumbai 2013, India

IT17 *Microscale CFD model for Wind Energy Forecast in a complex terrain*, National Center for Atmospheric Research, Boulder, Colorado, 2012 USA

IT18 *A Multiscale Approach to Micrositing of Wind Turbines, Trønderenergie*, Trondheim, Norway

IT19 *Multiscale Modeling of Urban Climate*, Department of Engineering, University of Cambridge, Cambridge 2009, UK

Scientific Reports

SR1 Tabib M and Rasheed A, *Machine Learning based investigation of influence of weather on transport mobility.* SINTEF Report

SR2 Rasheed A, Tabib M and Midtbø KH, *Evaluating the terrain induced wind and turbulence conditions at the Ørsta Volda Airport to design approach and departure trajectories.* SINTEF Report

SR3 Rasheed A, Tabib M and Midtbø KH, *Evaluating the terrain induced wind and turbulence conditions at the Sandane Airport to design approach and departure trajectories.* SINTEF Report

SR4 Rasheed A, Tabib M, Phase 2+3: *Assessment of the impact of a proposed building on a the flying condition on the runways at the Stavanger Airport, Sola using numerical simulations*, SINTEF Report

SR5 Rasheed A, Tabib M, *Phase 1: Assessment of the impact of a proposed building on a the flying condition on the runways at the Stavanger Airport, Sola using numerical simulations*, SINTEF Report

SR6 Rasheed A, Tabib M and Franz Fuchs, *Wake Vortex Micro-Scale Turbulence Prototype Development and Sensitivity Studies*, Contribution to SESAR 12.2.2 report

SR7 Tabib M, Fuchs F and Rasheed A, *Report on wake vortex micro-scale turbulent airflow interaction methodologies*, Contribution to SESAR 12.2.2 report

SR8 Rasheed A, Fonn E and Tabib M, *Evaluaring av flyforhold på GimsSørliya for en potensiell flyplass*, March 2016, SINTEF REPORT: 27374

SR9 Rasheed A and Tabib M, *Investigation of the impact of a proposed building on the flying conditions for helicopters inside the Bodø airport*, March 2016

SR10 Sørli K, Tabib M, Rasheed A, *Analysis of Turbulent Wakes behind Helicopter Hangers at Sola airport*, June 2015, SINTEF Report: A27048

SR11 Tabib M, Rasheed A, *Impact analysis of the proposed parking lot on the flying condition close to the Kristiansund airport*, May 2015, SINTEF Report: F26978

SR12 Rasheed A, Tabib M, *Investigation of flying conditions at the Stavanger airport, Sola using numerical simulations*, October 2014 SINTEF Report F26399

SR13 Rasheed A, Sørli K, *Analysis of Terrain-induced Turbulence at Bergen Airport Flesland in Connection with new locations for Bergen Harbor: A qualitative analysis*, April 2013 SINTEF Report

SR14 Sørli K, Rasheed A, *Analysis and Siting of a New Runway at the Sandnessjoen Airport, Stokka with respect to mountain induced turbulence*, September 2011 SINTEF Report F20557

SR15 Sørli K, Rasheed A *Terrain-forced Wind and Turbulence and Optimization of Local Domains and Grids for Terrain-induced Turbulence Forecast*, July 2011 SINTEF Report F19928

SR16 Rasheed A, Sørli K, Midtbø KH, *Analysis of Terrain-Induced Turbulence on Alternative Airport Locations at the Faroe Islands using Numerical Simulation*, July 2011 SINTEF Report F19941

SR17 Rasheed A, Sørli K, *Methods of improving the system for terrain induced turbulence forecast at Norwegian Airports*, December 2010 SINTEF Report F17589

SR18 Rasheed A, Sørli K, *Evaluation of the Impact of the Construction of a New Harbor near Flesland Airport in Bergen*, September 2010 SINTEF Report F16472

SR19 Rasheed A, Sørli K, *Estimation of the Terrain Induced Turbulence on the Alta Airport using Numerical Simulations*, July 2010 SINTEF Report F16291

SR20 Rasheed A, Sørli K, *Estimation of the Terrain Induced Turbulence on the Haugesund Airport using Numerical Simulations*, July 2010 SINTEF Report F16290

SR21 Rasheed A, Sørli K, *CFD analysis of Terrain Induced Turbulence at Kristiansand Airport Kjevik*, April 2010 SINTEF Report F15622

SR22 *Final Scientific Report for Swiss National Science Foundation: Multiscale Modeling of Building Urban Interactions* NRP 54 Sustainable Development of the Built Environment

SR23 PhD Thesis: *Multiscale Modeling of Urban Climate*, EPFL, Lausanne, Switzerland112.

SR24 Masters Thesis: *A Numerical and Experimental Study of the Scavenging Process of a Two-Stroke IC Engine*, Mechanical Engineering Department, Indian Institute of Technology Bombay 2005

SR25 Bachelors Thesis: *Evaluation of the performance of various Heat Transfer Enhancement Devices in a Square Channel*, Mechanical Engineering Department, Indian Institute of Technology Bombay 2004

SUPERVISION

PhD (sup)

P1 Oluwaleke Yusuf Umar, PERSEUS position, Future mobility solution, 2023,2026
P2 Karl Johan Haarberg, Industry Ph.D., 2022-2025
P3 Mehmet Altindal, Hole Cleaning Monitoring, 2023-2026
P4 Daniel Menges, SFI Autiship, Situation awarenss, 2022-2025
P5 Florian Stadtman, Enabling technologies for Digital Twins, 2021-2024
P6 Alberto Mino, Explainable AI 2020-2024
P7 Thomas Nakken, Reinforcement Learning for Drones 2020-2024
P8 Haakon Robinson, Trustworthy Machine Learning for Controlled Dynamic Systems, 2019-2023

PhD (co-sup)

PC1 Florian Wintel, 2023-2026
PC2 Muhammad Tsaqif Wismadi, 2023-2026
PC3 Mohammed Ayalew Belay, 2021-2024
PC4 Even Klemsdal, Multiagent reinforcement learning, 2020-2024
PC5 Valentin Antoine Formont, 2021-2024
PC6 Wanwan Zhang, Predictive maintenence and decision support 2021-2024
PC7 Håvard Bjørgan Bjørkøy, Big Data Cybernetics 2020-2023
PC8 Hans A. Engmark, Big Data Cybernetics 2020-2023
PC9 Roya Doshmanziari, Biofeedback 2020-2023
PC10 Abdallah Alshantti, On the Applications of Machine Learning for Alleviating Challenges in the Financial Crime Domain, 2019-2022
PC11 Erlend Lundby, Data-Driven Dynamical Modeling in the Face of Data Limitations 2019-2022
PC12 Prateek Gupta, Ship Performance Monitoring using In-service Measurements and Big Data Analysis Methods, 2019-2022
PC13 Midjiyaw Zakaria, Turbulence characterisation in complex fjord topography using measurement and numerical modelling for bridge design, 2022
PC14 Muhammad Salman Siddiqui, High Fidelity Simulation and Reduced Order Modeling of Wind Turbines, 2015-2018

Master's Projects

M1 Andreas Von Brandis, 2024
M2 Eirik Runde Barlaug, Reactive Quadrotor Guidance System Using Deep Reinforcement Learning, Autoencoders and Nonlinear Control, 2024
M3 Henrik Stokland Berg, 2024
M4 Jørgen Lind Fløystad, Reactive Quadrotor Guidance System Using Deep Reinforcement Learning, Autoencoders and Nonlinear Control, 2024
M5 Tobias Rotnes Aasen, 2024
M6 Elias Buø, 2024
M7 Magnus Selle, The Digital Twin-Ready Aquarium: A Step Towards Industry 4.0 in Aquaculture, 2024
M8 Magnus Haaker, 2024
M9 Olea Linnea Andersson, 2024
M10 Shayan Tafrishi, The Future of Correctional Workforce Management: AI and Societal Cybernetics to the Rescue, 2024
M11 Pernille Sofie Pedersen, 2024
M12 Kristoffer Arlind, 2024
M13 Håvard Einarssønn Høymork, 2024

M14 Marte Eggen, 2024

M15 Hedda Nielsen Dale, 2024

M16 Albert Johannessen, Physics informed neural network, 2022

M17 Jacob Wulff Wold, GAN Based Super-Resolution of Near-Surface 3D Atmospheric Wind Flow with Physics Informed Loss Function, 2023, **Journal article in Engineering Applications of Artificial Intelligence**

M18 Henrik Albin Larsson Hestnes, Machine Learning-Enabled Predictive Modeling of Building Performance for Electricity Optimization, 2023

M19 Aksel Vaaler, Safe Reinforcement Learning in Marine Navigation and Control: Using a Predictive Safety Filter for Safety Verification on Autonomous Surface Vessels, 2023, **Journal article in Artificial Intelligence and OMAE paper**, **NFEA Award**, **OpenAI Award**

M20 Kristoffer Skare, Unleashing the Potential of AI-Driven Digital Twins A Framework for Research using a Sensor-Enhanced Greenhouse, 2023, **Conference paper**

M21 Endre Bruaset, Unleashing the Potential of AI-Driven Digital Twins A Framework for Research using a Sensor-Enhanced Greenhouse, 2023, **Conference paper**

M22 Kristian William Macdonald Gulaker, Object detection in EM2040 point clouds

M23 Eivind Dogger, Multi-agent reinforcement learning with graph neural networks for optimizing an industrial sorting system

M24 Emil Johannesen Haugstvedt, On the Potential of Utilizing Laboratory-Scale Experimental Setup as Proxy For Real-Life Applications: Time Series Analysis and Prediction for Hole Cleaning, 2023, **Journal article published in IEEE Access**

M25 Eirik Rugaard Furevik, Physics-guided neural networks for aerodynamic characterization of wind turbines

M26 Henrik Andreas Gusdal Wassertheurer, Developing a predictive digital twin of a wind farm , 2023

M27 Ørjan Carlsen, Merging Classical Control and Deep Reinforcement Learning for Dynamic Collision Avoidance for a Quadcopter, 2023

M28 Svein Jostein Husa, Safe Reinforcement Learning in Marine Navigation and Control: Using a Predictive Safety Filter for Safety Verification on Autonomous Surface Vessels, 2023, **Journal article in Artificial Intelligence**

M29 Jannani JohanRaj, Improving Credit Management Practices: A Transdisciplinary Approach to Optimizing Risk and Profitability, 2023

M30 Marthe Aaberg, Improving Credit Management Practices: A Transdisciplinary Approach to Optimizing Risk and Profitability, 2023

M31 Kristian Brudeli, Path-following and Collision Avoidance using World Models, 2023

M32 Sondre Sorbø, Corrective Source Term Approach for improving Erroneous Physics-Based Models, 2022, **Journal article in Applied Soft Computing**

M33 Simon Mork Sætre, Laying The Foundation For an Artificial Intelligence-Powered Extendable Digital Twin Framework For Autonomous Sea Vessels, 2022, **OMAE Conference paper**

M34 Marcus Skagemo, Stacking classifiers for improved order execution

M35 Ludvig Løken Sundøen, Path Following for Quadcopters using Deep Reinforcement Learning

M36 Lars Gjardar Musæus, Fractal Analysis and Its Application on Time-Series Data – An Innovative Method for Condition Monitoring of Hole Cleaning Operations, 2022

M37 Elias Mohammed Elfarri, Digital Twin of a Building Powered by Artificial Intelligence and Demonstrated in Virtual Reality, **Tekna Award for project idea**

M38 Annfrid Hopland Myklebust, Building a digital twin of the thermodynamic behaviour of a building using hybrid modeling, 2022

M39 Anne Willkommen Eiken, Position Alignment and Geographical Location Determination of Railway Track Condition Monitoring Data, **Best Master's thesis award from BaneNor**

M40 Katarina Charlotte Guderud, Predicting feeding patterns in aquaculture

M41 Viljer Ness, Simulating Ordinary Differential Equations using the Physics-Guided Machine Learning Framework, 2021

M42 Vebjørn Malmin, Reinforcement Learning and Predictive Safety Filtering for Floating Offshore Wind Turbine Control, 2021

M43 Andrine Elsetrønning, Generalized workflow with uncertainty quantification for detecting abnormalities in lung sounds, 2021

M44 Julia Marie Graham, Geometric change detection in the context of Digital Twin, leveraging Dynamic Mode Decomposition, Object Detection and innovations in 3D technology, **Journal article in Digital**

M45 Marie Skatvedt, Sea bottom detection using Doppler Velocity Logger, 2021

M46 Torkel Laache, Physics Guided Machine Learning: Injecting neural networks with simplified theories, 2021, **Journal article in Frontiers in Robotics and AI**

M47 Halvor Ødegard Teigen, Reinforcement Learning and Predictive Safety Filtering for Floating Offshore Wind Turbine Control, 2021, **Journal article in Frontiers in Robotics and AI**

M48 Ole-Jørgen Hannestad, Securing trust in AI systems through increased explainability: linking Norwegian organizations' challenges in regards to eXplainable Artificial Intelligence (XAI) with a 2021 view on relevant techniques and methods, 2021

M49 Bendik Austnes, Increasing Validity and Uncovering Utility in Machine Learning Studies - An Illustrative Approach to Essential Concepts and Procedures in Model Development and Assessment, 2021

M50 Olav Landmark Pedersen, A proof-of-concept Digital Twin implementation for monitoring patients through the Clinical Pathway for Prostate Cancer in the Norwegian Health and Care Service, 2021

M51 Fredrik Pettersen, Making a digital twin of a heterogeneous rod under transient heat transfer

M52 Sindre Stenen Blakseth, Introducing CoSTA: A Deep Neural Network Enabled Approach to Improving Physics-Based Numerical Simulations, 2021, **Best Masters thesis award from the Norwegian Open AI Lab, 2 Journal articles in Neural Networks and Applied Soft Computing**

M53 Tiril Sundby, Towards Geometric Change Detection in Digital Twins using Dynamic Mode Decomposition, Object Detection and 3D Machine Learning, 2020, **Journal article in Digital**

M54 Daniel Nakken, A strategy controller for concave obstacle avoidance, 2020

M55 Thomas Nakken, On the applicability of a perceptually driven generative-adversarial framework for super-resolution of wind fields in complex terrain, 2020

M56 Eivind Meyer, On Course Towards Model-Free Guidance: A Self-Learning Approach To Dynamic Collision Avoidance for Autonomous Surface Vehicles, 2020, **Best Masters thesis award from the Norwegian Open AI Lab, 2 Journal Articles in IEEE Access**

M57 Eirik E. Vesterkjær, Combining grid-based uncertainty propagation and neural networks with uncertainty estimation, 2020

M58 Herman Stavelin, Biomass estimation using sonar and machine learning, 2020, **Journal Article in Ecological Informatics**

M59 Duy Tan Tran, Convolutional Neural Network and Generative Adversarial Networks Enabled Resolution Enhancement of Numerical Simulations, 2020, **Best poster award at the Deep Wind Conference**

M60 Simen Theie Havenstrom, From Beginner to Expert: Deep Reinforcement Learning Controller for 3D Path Following and Collision Avoidance by Autonomous Underwater Vehicles, 2019-2020, **Journal Article in Frontiers in Robotics and AI**

M61 Amalie Heiberg, Risk-based reinforcement learning for path following and collision avoidance, 2019-2020, **Journal Article in Neural Networks**

M62 Haakon Robinson, On the Piecewise Affine Representation of Neural Networks, 2019, **Runner-up best Masters thesis award from the Norwegian Open AI Lab**

Special projects

SP1 Kristine Stabell, Trajectorial risk assessment of autonomous surface vessels using AIS data, Bayesian networks, and machine learning, 2023

SP2 Andreas Von Brandis, Introducing predictive capabilities for an Autonomous Surface Vessel in a Digital Twin framework, 2023

SP3 Eirik Runde Barlaug, Low-Dimensional Latent Encodings for Enhanced Reinforcement Learning-Based Collision Avoidance, 2023

SP4 Henrik Stokland Berg, CNN-based situational awareness in marine applications; neural network search, 2023

SP5 Jørgen Lind Fløystad, Bi-Rotor Drone Doing Path Following and Collision Avoidance in the Vertical Plane Using Deep Reinforcement Learning, 2023

SP6 Vegard Bergum Hovland, Autonomous data sampling with a quadrotor drone using a digital twin of a smart house, 2023

SP7 Tobias Rotnes Aasen, General Deep Active Learning Framework for Nonlinear System Identification, 2023

SP8 Elias Buø, Nonlinear System Identification of Maneuvering Model using Deep Active Learning, 2023

SP9 Magnus Selle, Digital Twin-ready Aquarium, 2023

SP10 Magnus Haaker, Unveiling Trends and Challenges in Modern Logistics, 2023

SP11 Olea Linnea Andersson, Samfunnskybernetikk: Measuring the organizational health in companies from different industries using cybernetics analytics, neuroscience, psychology, etc.

SP12 Shayan Tafrishi, Samfunnskybernetikk: Measuring the organizational health in companies from different industries using cybernetics analytics, neuroscience, psychology, etc.

SP13 Pernille Sofie Pedersen, Ambient Temperature-Based Predictive Modeling of Energy Consumption for Standard Operations of a CO2 Cooling System in Porsgrunn, Norway, 2023

SP14 Kristoffer Arlind, The Use of Market Paradigm Adaptive Machine Learning Models for Short Term Stock Return Prediction

SP15 Gjermund Bae, Digital Twins of Listed Companies' to Accelerate the Net Zero Transition

SP16 Håvard Einarssønn Høymork, Autonomous Temperature Monitoring in a Dense Environment using a Micro Aerial Vehicle, 2023

SP17 Marte Eggen, Explainable AI on transformer models (HUNT dataset)

SP18 Hedda Nielsen Dale, Identifying Pain Points in the Industrial Value Chain: A Mixed-Methods Analysis

SP19 Albert Johannessen, Physics informed neural network, 2022

SP20 Eivind Dogger, Reinforcement learning for efficient control of parcels in an automated logistics system, 2022

SP21 Aksel Vaaler, Safe learning of small passenger ship, 2022

SP22 Emil Johannesen, Corrective Source Term with Sparse Neural Networks, 2022

SP23 Endre Bruaset, Experimental setup for discovering a dynamical model of plant growth, 2022

SP24 Erik Rugaard Furevik, Developing a wind forecast system for predictive digital twins, 2022

SP25 Hannah Hansen, CNN-based situational awareness and risk estimation using LiDAR perception in marine applications, 2022

SP26 Henrik Albin Larsson Hestnes, Digital Twin for Built Environment, 2022

SP27 Henrik Andreas Gusdal Wassertheurer, Developing a wind forecast system for predictive digital twins, 2022

SP28 Jannani Johanraj, Digital twin for business processes, 2022

SP29 Kristoffer Skare, Numerical setup for discovering a dynamical model of plant growth, 2022

SP30 Marte Aaberge, Digital twin for business processes. 2022

SP31 Ørjan Carlsen, Adversarial Reinforcement Learning ("Trial-by-Fire"), 2022

SP32 Svein Jostein Husa, Approximate MPC control of neural network dynamics, 2022

SP33 Sondre Sorbø, Physics Guided Neural Network-assisted Corrective Source Term Approach to Hybrid Analysis and Modeling, 2021

SP34 Simon Mork Sætre, Machine Learning in Unity, 2021

SP35 Marcus Skagemo, Improved market entry of long-term time horizon trading signals using short-term residual reversal, 2021

SP36 Ludvig Løken Sundøen, Path Following for Quadcopters using Deep Reinforcement Learning, 2021

SP37 Lars Gjardar Musæus, Railway Track Condition Monitoring and Data-Driven Predictive Maintainance, 2021

SP38 Elias Mohammed Elfarri, Digital Twin of Smart Housing: An Initial Setup of a Digital Twin Using The Capability Levels Framework, 2021

SP39 Annfrid Hopland Myklebust, Building a digital twin of the thermodynamic behaviour of a building using hybrid modeling, 2021

SP40 Anne Willkommen Eiken, Analysis of alignment methods for railway track geometry measurements, 2021

SP41 Katarina Charlotte Guderud, Predicting feeding patterns in aquaculture

SP42 Daniel Vennestrøm, Industry 4.0 digital twin for mobile robots operating in energy industry facilities, 2021

SP43 Hanna Backer Malm, Digital Twin for Enterprises, 2020

SP44 Viljer Ness, Digital Twin for Enterprises, 2020

SP45 Vebjørn Malmin, Model Predictive Control using Deep Neural Network, 2020

SP46 Andrine Elsetrønning, Machine Learning based anomaly detection in lung sound data, 2020

SP47 Julia Marie Graham, Combining Dynamic Mode Decomposition and Compressed Sensing for intrusion detection, 2020

SP48 Marie Skatvedt, Sea bottom detection using Doppler Velocity Logger, 2020

SP49 Torkel Laache, Reinforcement learning for path following and collision avoidance under the influence of wind and current, 2020

SP50 Halvor Ødegard Teigen, Reinforcement learning for path following and collision avoidance in 3-D, 2020

SP51 Ole-Jørgen Hannestad, Explainable artificial inelligence for bussinesses, 2020

SP52 Raja Iqran Iftikar, Bead classification in developing COVID-19 kit, 2020

SP53 Bendik Austnes, Analysis of hyperspectral images for detecting skin disease, 2020

SP54 Olav Landmark Pedersen, 2020

SP55 Fredrik Pettersen, Making a digital twin of a heterogenous rod under transient heat transfer, 2020

SP56 Sindre Stenen Blakseth, Hybrid Analysis and Modeling, 2020

SP57 Kari Moe, GANS assisted design of prosthetic arms for third world amputees, 2020

SP58 Eivind Meyer, Path Following and Collision Avoidance for Surface Vessel using Reinforcement Learning, 2019

SP59 Eirik E. Vesterkjær, Uncertainty Propagation and Applications to Neural Networks, 2019

SP60 Herman Stavelin, Object Detection Applied to Marine Data for Species Classification and Biomass Estimation, 2019

SP61 Duy Tan Tran, Generative Adversarial Networks assisted super-resolution simulation of atmospheric flows in complex terrain, 2019

SP62 Simen Theie Havenstrom, 3D Path Following and Motion Control for Autonomous Underwater Vehicles Using Deep Reinforcement Learning, 2019

SP63 Haakon Robinson, Reinforcement Learning based controllers for autonomous ships (path following with collision avoidance), 2018

SP64 Camilla Sterud, Reinforcement Learning based controllers for underwater vehicles (path following with collision avoidance), 2018

SP65 Daniel Nakken, Machine Learning Controllers for Robotic Manipulator, 2018

Extra Curricular.

Activities

Painting

– Exhibition: "Shades of nature", Public Library, Trondheim, March-April, 2015
– Exhibition and Workshop: Nritya Rytme, ISAK, Trondheim, May 2013
– Workshop: Evolution of Painting Skills, Christmas Seminar, SINTEF / NTNU, Dec 2011
– Workshop: Basics of Photography, Christmas Seminar, SINTEF / NTNU, Dec 2010
– Exhibition: Foire de Geneve: International Art Show Geneva, Palexpo, Geneva, Switzerland, November 2007
– Exhibition: Siddhi- Discover India, Zurich, Switzerland, 2007
– Exhibition: Fribourg, With Brazilian artist Eliana Dos Sontos
– Workshop: Art Air 2007, Geneva, Switzerland, September 2007
– Exhibition: Kala Darshan, IIT Bombay, Mumbai, 2005, 2004
– Exhibition: British Library, 1997
– Exhibition: Vani Chitrakala Kendra, Ranchi, 1997

Photography

– Self-learned photographer with works exhibited on my personal photoblog
– High Dynamic Range Imaging techniques

Computer Skills

– Machine Learning and Artificial Intelligence Libraries: Tensorflow, Keras, Torch, Scikit-Learn
– Languages: Python, Fortran, Shell Programming
– Simulation Softwares: OpenFoam, Fluent, Ansys
– CAD Modeling Softwares: Rhinocerous, AutoCAD, SolidWorks
– Word Processing: Latex, Microsoft Office
– Operating Systems: Unix/Linux, Mac, Windows