2020 Annual Research Outcome Report of the Liverpool Logistics, Offshore and Marine (LOOM) Research Institute

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LOOM members in 2020

Dr. David R. Allanson (DRA)
Dr. Milad Armin (MA)
Dr. Ariyan Ashkanfar (AA)
Dr. Musa Bashir (MB)
Dr. Eduardo Blanco-Davis (EBD)
Dr. Alan Bury (AB)
Dr. Chia-Hsun Chang (CHC)
Dr. Robert Darlington (RD)
Prof. Stephen Fairclough (SF)
Dr. Fang Bin Guo (FBG)
Prof. Ian Jenkinson (IJ)
Dr. Karl Jones (KJ)
Dr. Mohamed Kara-Mohamed (MKM)
Dr. Christos Kontovas (CK)
Dr. Sean Loughney (SL)
Dr. Linghai Lu (LL)
Dr. Sean Makleson (SM)
Dr. Dante Ben Matellini (DBM)
Dr. Christian Matthews (CM)
Dr. Marco Messina (MM)
Prof. Trung Thanh Nguyen (TTN)
Dr. Dimitrios Paraskevadakis (DP)
Dr. Robyn Pyne (RP)
Dr. Jun Ren (JR)
Dr. Ali Rostami (AR)
Dr. Mehdi Seddighi (MS)
Dr. Ava Shahrokhi
Prof. Jin Wang (JW)
Prof. Zaili Yang (ZY)
Dr. Qian Zhang (QZ)

Other members involved in PhD supervision at LOOM

Prof. T. Bektas, University of Liverpool (TB)
Prof. Juergen Branke (JB), Warwick University
Mr. P. Davies (PD)
Dr. C. Iris, University of Liverpool
Prof. Y. Jin (YJ), Surrey University
Ms B. Kelly (BK)
Abdul Khalique (AK)
Prof. Roland Larek (RL), Univ. of Applied Sciences, Germany
Dr. C. Michailides (CM), Cyprus University of Technology
Prof. S. Nazir (SN), University College of Southeast Norway
Dr. A. Ng (AN), University of Manitoba, Canada
Mr. G. Phylip-Jones (GPJ)
Dr. Z. Qu (ZQ)
Dr. R. Riahi (RR), Columbia Shipmanagement, Germany
Prof. S. Yang (SY), De Montford University

LOOM researchers (doctoral/postdoctoral) in 2020

Dr. I. Ademola
Dr. D. Agarwal
Dr. F. Ahmad Najib
Ala Al-Kafri
Dr. Y. Ancele
G. Asuelimen
K. Biela
W. Bin Abdul Halim
S. Caldwell
S. Campbell
S.L. Chandler Črnigoj
O. Chukwuka
A. Cliffe
N. Cook
J. Cutler
Dr. I. Deplano
A. Ehiagwina
J. Ender
C. Evans
Dr. S.Q. Fan
D. Fitch
S. Gbako
Ms X. Ge
S. Gibbons
S. Hassan
A. How
Dr. I. C. Ikewete
B. Ishaya
M. Jenkins
K. Ji
S. Jones
J. Reed-Jones
C. Kelly
H. Khansaheb

Dr. C. Lersteau
A. Makki
C. Michailides
F.A. Najib
I. Nawaz
L.C. Newton
S. Novoth
H. Oraith
M. Oregbeyiwa
Panagiotis Papageorgiou
C. Park
C. Pitt
Dr Chingpong (Mark) Poo
J. Reed-Jones
Dr Abbie Romano
C. Sakaris
O. Salih
L. Sanders
E. Shaw
H. Sivori
A. Spiteri
S. Symes
K. Takrouri
S. Toh
G. Tsapparellas
P. Ugedi
M. Usman
S. Waddington
Dr. R. Wang
Dr. Y. Wang
A. Withington
Dr. Y. Yang
D. Yazdani
Miss X. Zhan

Visiting researchers
Dr. D.Z. Huang
Ms Noor Fifinatasha Shahedan
X.J. Wang
Z. Yuan

Visiting professors
RAEng Professor D. Cooper, Risktec

It has been identified that the LOOM's research emphasis in 2021 is:
1. To further develop national and international collaboration.
2. To ensure sustainable research income growth.
3. To enhance on research output quality and research impact generation.
4. To enhance research infrastructure.

1. Research publications (published in 2020)

The following are the outputs published in 2020 (for details, see Appendix 1):
- 3 published reports.

- 4 book chapters.
- 61 SCI-cited refereed journal papers (incl. ESCI).
- 1 other journal paper.
- 21 refereed conference papers.
- 3 other publications.

2. Doctoral, postdoctoral and international research visiting projects (completed, on-going and started in 2020)

2.1 Research projects completed in 2020
PhD projects
1. Dr. F. Ahmad Najib, "Development of decision making techniques for analysing the designation of the Northern Sea Route (NSR)" (2013-2020), funded by Universiti Malaysia Terengganu. (DBM, *et al.*)
2. Dr. Y. Ancele, "Routing algorithms for optimisation of transportation systems" (2016-2020). (BM, *et al*)
3. Dr G. Asueliment "Risk assessment of offshore seismic survey in hostile environment: A case study of Artic oil and gas exploration" (2020). (EBD *et al.*)
4. Dr. S.L. Chandler Črnigoj, "Binaural sound applications for sensor technology" (2016-2020). (KJ, *et al.*)
5. Dr. I. Deplano, "Operational Research and Machine Learning Applied to Transport Systems" (2016-2020), funded by LJMU Scholarship. (TTN, *et al.*)
6. Dr S. Fan "The Influence of Seafarer's Emotion on Navigation Safety" (2020) (EBD *et al.*)
7. Dr. S. Hassan, "Pipeline quantitative risk assessment (QRA): Non-historic data-based assessment for onshore pipelines in Nigeria" (2017-2020), funded by the Petroleum Technology Development Fund. (JW, *et al.*)
8. Dr C. Ikewete "A Risk-based Verification Framework for Offshore Wind Farm Development: Design, Installation, Operations and Maintenance of Offshore Wind Turbines" (2020). (EBD *et al.*)
9. Dr. C. Kelly, "Investigation into the uses of Life Cycle Analysis (LCA) as an Alternative Method of Site Selecting Tidal Power Schemes" (2020). (EBD *et al.*)
10. Dr H. Oraith "The impact of human factors on safety of pilotage operations" (2020). (EBD *et al.*)
11. Dr. K. Takrouri, "Study of unsteady turbulence and drag reduction over patterned surfaces" (2016-2020). (MS, *et al.*)

Postdoctoral projects
12. Dr. I. Ademola, "Marine pollution prevention – the case of mobile ballast water management systems" (2020), funded by the EU (CK *et al.*)
13. Dr. Y. Ancele, "Active message queue for real-time rail information system" (2020), funded by the DfT via InnovateUK. (TTN, *et al.*)
14. N. Cook, "Web front-end for customer-operational information system for stations" (2019-20), funded by the DfT via InnovateUK. (TTN, *et al.*)
15. Dr. I. Deplano, "Cloud infrastructure for real-time rail information system" (2019-20), funded by the DfT via InnovateUK. (TTN, *et al.*)
16. C. Evans "Simulation research to identify the optimal social distancing measures and building capacity for LJMU Byrom Street campus – the case of entry and mixed student flows", (2020) funded by Estates, LJMU. (TTN, *et al.*)
17. S. Gibbons, "Managing the development process of LJMU's customer-operational information system for stations" (2019-20), funded by the DfT via InnovateUK. (TTN, *et al.*)
18. A. How, "Simulation research to identify the optimal social distancing measures and building capacity for LJMU Byrom Street campus – the case of egress", (2020) funded by Estates, LJMU. (TTN, *et al.*)
19. A. Makki, "Evaluating LJMU's customer-operational information system for stations" (2019-20), funded by the DfT via InnovateUK; "Simulation research to investigate and optimise social distancing in public transport in Liverpool City Region" (2020), funded by LJMU. (TTN, *et al.*)
20. Dr C. Sakaris, "Array health diagnosis and prognosis of floating offshore wind installations" (2019-2020), funded by EU. (MB *et al.*)
21. G. Tasapparalas "Mind-My-Bumpy-Ride: a machine learning model on mobile phones to identify potholes from cycling behaviours" (2019-20), funded by the DfT. (TTN, *et al.*)
22. Dr. R. Wang, "Processing real-time data and message parsing in rail environments" (2019-20), funded by the DfT, "ANTI-SLIP: Anticipate and mitigate the impact of slippery rail" (2020), funded by the Rail Safety and Standard Boards; "Pilot simulation research to understand social distancing measures and building capacity in James Parsons building" (2020), funded by Estates, LJMU; "Mind-My-Bumpy-Ride: a machine learning model on mobile phones to identify potholes from cycling behaviours" (2019-20), funded by the DfT. (TTN, *et al.*)
23. A. Withington, "Analysing data from train black boxes to understand the impact of low adhesion" (2020), funded by the RSSB (TTN, *et al.*)
24. Dr. Y. Yang, "Integrity modelling of floating offshore wind installations" (2018-2020), funded by EU. (MB, *et al.*)

Visiting research projects
25. Dr. Daozheng Huang, "Identification and new game model of China's strategic transport passages in the context of Belt and Road Initiative" (2019-2020), funded the Shanghai Municipal Education Commission. (SL *et al.*)
26. Ms Noor Fifinatasha Shahedan, "Concrete performance tests and analysis" (Nov 2019 to March 2020), funded by EU Prigeoc. (Bras, *et al.*)
27. Xinjian Wang, "Research on key issues associated with human behaviour under emergency evacuation in passenger ship" (12/2019-3/2020), funded by the China Association for Science and Technology. (SL *et al.*)
28. Z. Yuan, "AIS data processing and water traffic optimisation" (10/2019-10/2020), from Wuhan University of Technology, funded by China Scholarship Council. (QZ, *et al.*)

2.2 On-going research projects in 2020
Doctoral projects
29. Miss K. Biela, "Voice tampering, alterations and audio deepfakes: standardisation of detection methods" (2019-2022). (KJ, *et al.*)
30. S. Caldwell, "Integrated decision support for sustainable maritime supply chains: Understanding the harmonisation of big data and industry 4.0" (2019-2022). (RD, *et al.*)

31. J. B. Campbell, "A study of turbulence and heat transfer in pulsating flows", funded by LJMU FET Scholarship (2019-2022). (MS, *et al.*)
32. O. Chukwuka, "Risk analysis for emergency supply chain with particular focus on intermodal transport" (2019-2022), funded by Nigeria. (JR, *et al.*)
33. J. Cutler, "Performance Evaluation of a Combined Floating Offshore Energy System (CFOES) in Operational and Extreme Conditions" (2019-2022), funded by LJMU Scholarship. (MB, *et al.*)
34. A. Ehiagwina, "Agent based modelling of port traffic" (2018-2021), funded by LJMU. (IJ, *et al.*)
35. J. Ender, "A research into interaction among humans, machines and networks across the digitised industry at present and in the future" (2017-2021), funded by HS Wismar - University of Applied Sciences, Germany. (FBG, *et al.*)
36. Ms X. Ge, "The Impact of Ethnographic Research for Urban Regeneration, in Particular the Redevelopment of Post-industrial Sites in China" (2019-2022), (FBG, *et al*)
37. M S. Gbako, "Benchmarking the current state of the art of Inland Waterways" (2019-2022). (DP, *et al.*)
38. M. Jenkins, "An investigation and evaluation of workplace substance misuse programmes and compliance with drug and alcohol policy" (2019-2024). (DBM, el at.)
39. K. Ji, "Swarmintelligence-based decision-making for many-agent autonomous systems" (2017-2021), funded by LJMU and CSC. (QZ, *et al.*)
40. S. Jones. "Reciprocity and Mutuality: A Study into the Emergence of a New Maritime Economy in the Liverpool City Region (2019-2022). (IJ, *et al.*)
41. H. Khansaheb, "Solutions to the sedimentation and maintenance of semi-enclosed channels (2019-2022). (IJ, *et al.*)
42. A. Makki, "The impact of heavy good vehicles on road traffic flow" (2016-2021). (TTN, *et al.*)
43. I. Nawaz, "Risk-based verification of offshore installations on the United Kingdom continental shelf" (2012-2021), funded by Lloyd's Register. (DBM, *et al.*)
44. L.C. Newton, "Investigating turbulent-turbulent transition of transient flow over smooth and rough surfaces" (2019-2022), funded by LJMU FET Scholarship. (MS, *et al.*)
45. S. Novoth, "Formation planning and control of swarm autonomous robotic systems" (2018-2021), funded by LJMU Scholarship. (QZ, *et al.*)
46. M. Oregbeyiwa, "Increasing energy efficiency in ports" (2019-2022). (CHC, *et al.*)
47. P. Papageorgiou, "A novel framework for maritime security assessments" (2017-2021). (CK, *et al.*)
48. C. Park, "Cybersecurity risk assessment in the maritime industry" (2019-2022). (CHC, *et al.*)
49. J. Reed-Jones. "Binaural Sound Localisation for Smart Sensors using Hybrid Neural Networks" (2019-2022), funded by LJMU Scholarship. (KJ, *et al.*)
50. O. Salih, "Investigation of an intelligent shunt for Hydrocephalus monitoring" (2018-2021). (MM, *et al.*)
51. Mr L. Sanders, "Design at sea - Incorporation of human-centred design in maritime operations for seafarer reliability" (2019-2022), partially-funded by LJMU scholarship. (FBG, *et al*)
52. E. Shaw, "Investigation and analysis into the current status and future direction relating to the application of complex computer technology for safety-critical systems in the marine sector" (2017-2021), funded by LJMU scholarship. (DBM, *et al.*)
53. Miss Hazel Sivori, "Maritime Simulation-based stress-induced analysis and mitigating methods while applying functional near-infrared spectroscopy (fNIRS)" (2019-2022), funded by a FET scholarship. (EBD, *et al.*)
54. A. Spiteri, "Ship hull drag reduction using air cousin induced by a modified hull" (2019-2022). (MA, *et al.*)
55. S. Symes, "Ship simulator-based seafarers' skill acquisition incorporating the use of Functional-Infrared Spectroscopy (fNIRS)" (2017-2021), funded by LJMU scholarship. (ZY, *et al.*)
56. S. Toh, "Computational wear analysis for orthopaedic applications" (2019-2022). (AA, *et al.*)
57. P. Ugedi, "Assessing the effectiveness and implementation of the SOLAS Verified Gross Mass (VGM) Regulation" (2016-2021), funded by the Faculty and the Nigerian Maritime Administration and Safety Agency. (CK, *et al.*)
58. M. Usman, "Health management of marine engines" (2015-2021), funded by Lloyd's Register and LJMU. (ZY, *et al.*)
59. Miss X. Zhan, "What emotion design can help urban regeneration in particular post-industrial zones" (2019-2022). (FBG, *et al.*)

On-going postdoctoral project
60. Dr. D. Agarwal, "Rotorcraft simulation fidelity" (2019-2022), funded by EPSRC. (LL)
61. Dr. I. Deplano, "Intelligent dashboard to collect and analyse real-time sensor data for sustainable travel" (2019-21), funded by the ERDF. (TTN, *et al.*)
62. D. Fitch, "Managing the development, installation, evaluation and maintenance processes for the Smart Green Things – a suite of digital products for LCR Sustainable Green Travel Corridors" (2019-21), funded by the ERDF. (TTN, *et al.*)
63. Dr. Michailides Constantine, "Structural health modelling of floating offshore wind turbines" (2018-2021), funded by EU. (JW *et al.*).
64. G. Tasapparalas, "IoT system for cycling/walking" (2019-21), funded by the ERDF. (TTN, *et al.*)

Visiting research project
65. Dr. D. Cooper, "Safety and Engineering Risk Management" (2018-2021), Visiting Professor from Risktec and funded by the Royal Academy of Engineering. (DBM, *et al.*)

2.3 Research projects started in 2020

Doctoral projects
66. A. Habib, "Analysis of Sustainable Supply Chain Management (SSCM) practice in the Ethiopian coffee supply chain" (2020-2023). (JR, *et al.*)
67. B. Ishaya, "A risk assessment framework on the prevention and management of modern-day slavery in global supply chain" (2020-2024). (DP *et al.*)
68. C. Pitt, "Total Knee replacement; why they fail prematurely and how to increase their lifespan?" (2021-2024). (AA, *et al.*)
69. R. Ren, "Development of a novel risk management system for cold chain packaging" (2020-2023). (JR, *et al.*)

Postdoctoral projects
70. N. Cook, "Mobile application for active travel" (2019-20), funded by the ERDF. (TTN, *et al.*)

71. C. Evans, "Web authentication and other cloud development for sensor monitoring and evaluation" (2020-21), funded by the DfT via LCR CA. (TTN, *et al.*)
72. C. Froment, "Storyboarding and video production for LJMU rail research" (2020-21), funded by the DfT via InnovateUK. (TTN, *et al.*)
73. J. Kolonic, "AV engineering for promoting LJMU rail research products" (2020-21), funded by the DfT via InnovateUK. (TTN, *et al.*)
74. Dr O. Maklad, "On the Development of a Novel Approach in Modelling of Turbulent Pulsating Flows" (2020-2023), funded by EPSRC. (MS, *et al.*)
75. T. Morris, "Handling real-time data stream and messaging for railway systems" (2020-21), funded by the DfT via InnovateUK. (TTN, *et al.*)
76. A. Palin, "Managing the development process of communication and information system for railway staff" (2020-21), funded by the DfT via InnovateUK. (TTN, *et al.*)
77. Dr Chingpong Poo, "Blue Economy and Climate adaptation" funded by EU (2020-2021). (ZY, *et al.*)
78. Dr Abbie Romano, "Blue Economy and Knowledge Transfer" funded by EU (2020-2021). (ZY, *et al.*).
79. Dr M. Seddiq, "Development of next generation of Anilox Rolls and Sleeves" (2020-2021), funded by InnovateUK. (MS, *et al.*)
80. E. Shaw, "Risk-based specifications of portable power packs for different applications", funded by the Ministry of Defence via QinetiQ (2020-2021). (MB, *et al.*)
81. R. Tuladhar, "Front-end development for communication systems in rail" (2020-21), funded by the DfT via InnovateUK. (TTN, *et al.*)
82. Dr. Y. Wang, "Emergency decision support system of offshore platform fires" (2020-2022), funded by EU. (JW, *et al.*)
83. A. Withington, "Designing user experience and human-computer interaction for railway systems" (2020-21), funded by the DfT via InnovateUK. (TTN, *et al.*)

Visiting research projects
84. B. Qian, "Advanced planning and control methods for multi-agent robotic systems" (02/2020-02/2021), funded by Shanghai Dianji University. (QZ, *et al.*)

3. LOOM monthly seminars in 2020

2 LOOM monthly seminars were organised in 2020. The 2020 LOOM monthly seminars are detailed in Appendix 2. COVID 19 led to a significant reduction of delivery of LOOM seminars.

4. Research grants in 2020

4.1 External grants
Grants completed in 2020
- CILT - Risk evaluation of autonomous surface ships (2019-2020), £7,500 (CHC)
- IAMU - Cybersecurity in the maritime industry (2019-2020) $20,000 (CHC)
- EU ERDF Interreg - Atlantic Blue Port Services (2017-2020) €185,400 (CK, *et al.*)
- PTDF - Onshore pipeline safety assessment (2017-2020) £15,000 (JW, *et al.*)
- CSC - Supply chain research (2017-20) £32,000 (QZ, *et al.*)
- RSSB – ANTI-SLIP – forecasting adhesion (2019-2020) £99,000 (TTN, *et al.*)
- DfT T-TRIG - Mind My Bumpy Ride (2020) £30,000 (TTN, *et al.*)
- InnovateUK & DfT – Customer information system (2019-2020) £265,000 (TTN, *et al.*)
- UK EPSRC – Vehicle Cleanliness (2018-2021) £50,000 (ZY)
- UK DfT – Cycling risk prediction (2018-2020) £55,000 (ZY, *et al.*)

On-going grants in 2020
- RAEng., VP in Risk Management (2018-2021) £30,000 (DBM, *et al.*)
- AHRC-Newton fund: Urban revitalisation (2018 – 2021) £249,290 (FBG, *et al*)
- EU H2020, REMESH – Emergency Resources Chain (2019-2022) €1,300,000 (JR, *et al.*)
- H2020 RESET – Rel. and Safety Eng. and Tech. (2017-2021) €1,471,500 (JW, *et al.*)
- Research In geopolymer concretes (EU H2020, 2016-2021) €180,000 (out of €516k) (JW, *et al.*)
- Resilience of off. wind energy platforms, Royal Soc. (2018-21) £12,000 (JW, *et al.*)
- UK EPSRC - Rotorcraft simulation fidelity (2018-2022) £365,697 (LL)
- EU, RoCS - Rotorcraft Certification by Simulation (2019-2022) €140,000 (out of €3m) (LL)
- EU Interreg - ARCWIND - Floating wind energy (2017-2021) €400,437 (out of €4m) (MB & JW, *et al.*)
- EU ERDF – LCR Green Sustainable Corridors (2018-2021) £673,000 (out of £8.35m) (TTN, *et al.*)
- EU Erasmus+, SKILSEA: Futureproof Skills (2019-2023) €148.860 (out of €4m) (RP, *et al.*)
- InnovateUK - Next generation of Anilox Rolls (2019 – 2021) £396,431 (Sharp & MS, *et al.*)
- EU H2020 – Food Supply Chains (2018-2022) €189,000 (ZY, *et al.*)
- EU H2020 – Human reliability and training (2019-2022) €173,000 (out of €1m) (ZY, *et al.*)
- EU Interreg - Knowledge transfer for blue economy (2019-2022) €480,000 (out of €2.43m) (ZY, *et al.*)
- ERC – Container transport resilience (2020-2025), €1,990,000 (ZY)

Grants started in 2020
- MarRI UK - Lookout Awareness of Distractions (2020-2022) £170,000 (AK, FBG, *et al.*)
- IAMU - Organizational Development Project (2020 – 2022) $28,676 (IJ, *et al.*)
- EU Horizon 2020 – Offshore fire emergency systems (2020-2022) €224,934 (JW, *et al.*)
- RAEng - Decommissioning of Offshore Structures (2020-2024) £12,800 (out of £200k) (JW, et al.)
- RAEng- Safer End to Engineered Life (2020-2021) £10,000 (MA, *et al.*)
- MoD/QinetiQ Ltd - Specifications of Power Packs (2020-2021) £55k (MB, *et al.*)
- EPSRC - Modelling of Turbulent Pulsating Flow (2020 – 2022) £259,481 (MS, *et al.*)

- Innovate UK – Flexible Manufacturing (2020-2022) £120,000 (RD, *et al.*)
- InnovateUK & DfT – communication system for rail (2020-2021) £330,000 (TTN, *et al.*)
- UK DfT - PopupWatch - Emergency popup routes (2020-21) £18,000 (TTN, *et al.*)

Grants awarded in 2020
- UKRI - Modelling of Turbulent Pulsating Flows (2021-22) £14,000 (MS, *et al.*)
- IAMU - Maritime Safety Optimization (2021-2022) $20,000 (SL, *et al.*)
- UKRI – IRIS2 – Information system for railway staff £97,000 (TTN, *et al.*)

5. Evidence of national and international peer esteem in 2020

a. Invited plenary addresses/keynote paper/presentation at international conferences/research seminar
- Jones K.O. (with K. Biela), "Audio & video forensics - Does the criminal justice system understand engineering fundamentals?", Plenary speaker, 9th International Conference on Advanced Technologies, Istanbul, Tukey, 10-12 August, 2020
- Yang Z., "Key Green Performance Indicators (KGPIs) for vehicle cleanliness evaluation", Keynote Speech in the 9th International Conference on Traffic and Transport Engineering (ICTTE) Conference (online), 29-31 December, 2020.
- Yang Z., "Risk analysis in shipping, port and maritime logistics: Advanced uncertainty modelling" Keynote Speech in the Sustainable Maritime Transport Forum of World Transport Convention (WTC) Conference (online), 12-13 Oct, 2020.

b. Other invited presentations
- Pyne R.P., "Future proofing Maritime Education Training - Digital competence". 8th Maritime Trends Conference, Invited speaker, Athens, 9th May 2020 (postponed due to Covid-19).
- Shekwoyemi G., Paraskevadakis D., Ren J., Wang J. "Benchmarking the current state of the art of inland waterways through digitalisation and standardisation", e-LRN conference CILT, Cardiff, 10 September 2020.
- Wang J., Loughney S., "Decommissioning in the North Sea", in an international seminar "Challenges and Opportunities in Offshore Decommissioning in South East Asia and Beyond", 23 Nov. 2020, at Universiti Teknologi Malaysia, Jahor, Malaysia, https://utm.webex.com/recordingservice/sites/utm/recording/playback/8a8e8735df0b4b909c60f2d170c6d458 (password: TzAES2QS).
- Yang Z., "Human Reliability Analysis: Case Studies in Maritime Operations" Invited speech in the 4th International Conference on Maritime Safety and Smart Shipping (MSSS 2020) (online), 5-6 October 2020.
- Yang Z., "Quantitative Evaluation of Green Port Development" Invited speech in the Low Carbon Transport and Cities online webinar, sponsored by the Science and Innovation Network - British Embassy Bucharest and UK Connected Places Catapult (online), 4th September 2020.

c. Participation in journal editorial boards
- Editorial Board of Journal of Renewable Energy, MDPI Energies Journal and MDPI Applied Sciences. (AS)
- Member of Editorial Board Maritime Business Review. (CHC)
- Member of Section Board for Sustainable Transportation Section - MDPI Sustainability. (CK)
- Member of Editorial Board International Journal of Transportation Engineering and Technology. (DP)
- Member of the Review Board of Journal of Shipping and Ocean Engineering. (EBD)
- Member of the Review Board of International Journal of Ocean Systems Engineering (). (JR)
- Member of the Review Board of International Journal of Agile Systems and Management. (JR)
- Member of the Editorial Board of Maritime Policy and Management. (JW)
- Deputy Editor of Journal of Marine Science and Technology. (JW)
- Member of the Editorial Board of Journal of Engineering for the Maritime Environment. (JW)
- Member of the Editorial Board of Journal of International Journal of Reliability, Quality and Safety Engineering (JW)
- Member of the Editorial Board for the International Journal of Intelligent Systems and Applications in Engineering. (KJ)
- Member of the Editorial Board for the American Journal of Neural Networks and Applications. (KJ)
- Member of the Scientific Board for the Informatica Economica Journal (http://revistaie.ase.ro/). (KJ)
- Member of the Editorial Board for the Journal of Mathematical Control Science and Applications. (KJ)
- Member of the Editorial Board (Topic Editor) for Mathematics. (KJ)
- Member of editorial board of the Journal of Mechanical Engineering Research. (MA)
- Member of the Review Board of Ocean Engineering Journal. (MB)
- Member of the Review Board of Journal of Waterway, Port, Coastal, and Ocean Engineering. (MB)
- Lead Guest Editor of a Special Issue in Mathematical Problems in Engineering. (QZ)
- Member of the Review Board of Marine Policy. (RP)
- Co-Editor of Frontiers in Human Neuroscience research theme "Detection and Estimation of Working Memory States and Cognitive Functions Based on Neurophysiological Measures". (SF)
- Member of the Editorial Board for IEEE Transactions on Affective Computing. (SF)
- Guest Editor, Mathematical Problems in Engineering (TTN)
- Member of Editorial Board of European Journal of International Management. (ZY)
- Member of Editorial Board of Journal of Marine Science and Engineering. (ZY)
- Member of Editorial Board of Journal of Transportation Research Part E: Logistics and Transportation Review. (ZY)
- Associate Editor of IMA Journal of Management Mathematics. (ZY)
- Member of Editorial Board of Ocean and Coastal Management. (ZY).
- Member of Editorial Boards of the ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems: Part A Civil Engineering and Part B Mechanical Engineering. (ZY)

d. Participation in national or international advisory, review, funding, standards or planning bodies
- Advisor on the Ports and Terminals Advisory Group for UK Trade & Investment (UKTI). (IJ)
- Member of the IMO Formal Safety Assessment Experts Group. (JW)
- Member of sub-panel 12 (criteria phase, Engineering) in Research Excellence Framework (REF) in the UK 2021. (JW)
- Member of the UK EPSRC peer review college of experts. (JW, ZY)
- Reviewer for EPSRC. (LL, MS)

- Editorial Advisor, Cambridge Publishing Group. (TTN)
- External reviewer, the National Foundation for Science and Technology Development of Vietnam. (TTN)
- Member of the IEEE Task Force on Evolutionary Computation in Dynamic and Uncertain Environments. (TTN)
- Advisor of the UK Government for Science on "Future of the Sea" programme. (ZY)
- Evaluator/overseas expert/panel member of peer review bodies of the national research councils (or equivalent) of Norway, Poland, USA, UK, Romania, China, and Hong Kong, Netherland, Canada. (ZY)

e. Learned society involvement
- Vice Chair of the Chartered Institute of Logistics and Transport (CILT) Merseyside and Warrington group. (DP)
- Committee member of the North West Branch of the IMarEST. (GPJ & EBD)
- Committee member of the Consortium of Manufacturing Engineering Heads. (IJ)
- Chairman of Maritime Transportation Safety, European Safety and Reliability Association (ESRA). (JW)
- Member of the Maritime Innovation Committee of the Royal Institution of Naval Architects. (JW)
- Member of Council for the Institute of Measurement and Control. (KJ)
- Member of Institute of Electrical and Electronics Engineers. (LL)
- Member of American Institute of Aeronautics and Astronautics. (LL)
- Member of American Helicopter Society; Royal Aeronautical Society. (LL)
- Member of EG38 GARTEUR (Aeronautics research collaboration in Europe). (LL)
- Member of UK VLN (Vertical Lift Network). (LL)
- President of Psychophysiology in Ergonomics (an international working group of the International Ergonomics Association). (SF)
- Co-Chairman, YoungShip Liverpool. (SL)
- Founding director of International Association of Transport, Trade and Service Studies (IATTSS). (ZY)
- Member of International Association of Maritime Economics (IAME). (ZY)

f. External PhD examinership
- 1 PhD examination at Norwegian University of Science and Technology, Norway. (JW)
- 1 PhD examination at University of Tehran. (MS)
- 2 PhD examination at the University of Southampton and at the University of Lincoln. (QZ)
- 1 PhD examination at Loughborough University. (RD)
- 3 PhD examinations at Aberdeen University, UK and Sydney University and Tasmania University Australia. (ZY)

g. Involvement of conference organisation
- Committee Member, Logistics Research Network conference (LRN), Chartered institute of Logistics and Transport, 8-10 September 2021, Cardiff University. (DP)
- Chairman of the Research network on emergency resources supply chain (REMESH) Workshop, 09 September 2020, Skype, Liverpool, UK. (JR)
- Programme Co-Chair of the 9th International Conference on Traffic and Transportation Engineering, Naples, Italy, 2020. (ZY)

h. Prizes/honours
- Emerald Literati Award Highly Commended Paper, paper title: 'Selection of effective risk mitigation strategies in container shipping operations', published in Maritime Business Review, awarded by Emerald in Emerald Literati Award 2020. (CC and ZY)
- ALRT Conference Best Paper Award, paper title "Evaluating recovery strategies for the disruptions in liner shipping networks: A resilience perspective", awarded in Asian Logistics Round Table 2020 Conference, Tasmania, November 19-20, 2020. (ZY)

i. Consultancy
- Merseyrail, Merseytravel, LCR Combined Authority, Sefton Council, St Helens Council, Wirral Council, Liverpool City Council, Knowsley Council, Halton Council, DfT. (TTN)
- UK DfT, AECOM, Transport Systems Catapult, TfGM, Mersey Travel, TfN. Liverpool Combined Authority (on Free Port programme). (ZY)

j. Others
- MSc thesis by Krishna Soprayen runner up in Maritime UK Maritime Masters competition. (CK, *et al.*)
- Working in partnership with Risktec Solutions delivering distance learning and face-to-face modules. (DBM)
- LJMU's representative as a member of UK VLN (Vertical Lift Network). (LL)
- Participating University Maritime Masters programme (Maritime UK). (RP)
- Host institution for the Institute of Chartered Shipbrokers Global Open Day, January 2020. (RP)

Appendix 1: Publications published in 2020

Published industrial reports
1. Hjelle H.M., Lin N., Bergqvist R., Eidhammer O., Mangan J., Yang Z., van Rijn J.A.M,, Zomer G.R. Alternative supply chains designs for containerized cargo from China to peripheral regions in Europe. Final report of the SeaConAZ project. Financed by the TRANSPORT 2025 program of the Research Council of Norway, TNO report number 1909, NTO identifier 880077, TNO, 2020, 149 pages, https://repository.tno.nl/islandora/object/uuid:33e65d70-e1ba-44c7-8dc6-647bc2043edf.
2. Loughney S., Wang J., Wall A., Ship/Platform collision incident database (2015), The Health and Safety Executive (HSE). HSE Book RR1154, 2020, 175 pages, https://www.hse.gov.uk/research/rrhtm/rr1154.htm.
3. Wall A., Loughney S., Ma F., Wang, J., Vessel collision threat detection for offshore oil and gas installations, The Health and Safety Executive (HSE). HSE Book RR1153, 2020, 100 pages, RR1153, https://www.hse.gov.uk/research/rrhtm/rr1153.htm

Book chapters
4. Ha M., Yang Z., Seo J., "Port performance measurement: A multi-stakeholder approach", In Section Traffic Management (Eds by Edward Chung) of International Encyclopaedia of Transportation (Eds by Vickerman R.), Elsevier, 2020, ISBN: 9780081026717.
5. Qu Z., Wan C., Yang Z., "Resilience in freight transport networks", In Section Freight Transport and Logistics (Eds by Cullinane K.) of International Encyclopaedia of Transportation (Eds by Vickerman R.), Elsevier, 2020, ISBN: 9780081026717.
6. Wang T. Qu Z. Yang Z., Ng A., "How does the UK transport system respond to the risks posed by climate change? An analysis from the perspective of adaptation planning", Chapter 6 In Maritime Transport and Regional Sustainability (Eds by Ng A. Monios J. and Jiang C.), Elsevier, 2020.
7. Yang Z., Wang Y., Li D., Hjelle. H., Yan X., Shi X., Cullinane K., Zhang D., Huang A., Wang J., Riahi R., Hernandez J., Brake P., "Challenges and developments in integrated container supply chains – A research agenda on Europe-China research network on integrated container supply chains (ENRICH) project", In Collaborative logistics and intermodality – Integration in Supply Chain Network Models and Solutions for Global Environments (Eds by Hernández, J.E., Li, D., Jimenez-Sanchez, J.E., Cedillo-Campos, M.G., Wenping, L.), Springer, 2020, ISBN: 978-3-030-50958-3.

*Refereed academic journal papers (SCI cited)**
8. Alghami A., Yang Z., Blanco-Davis E., "An advanced risk assessment approach for petroleum transportation using fuzzy rule-Based Bayesian reasoning", International Journal of Shipping and Transport Logistics, 2020, Vol.12. No.1-2, 39-64. (IF: 1.30)
9. Asuelimen G., Blanco-Davis E., Wang J., Yang Z., Matellini D.B., "Formal safety assessment of a marine seismic survey vessel operation, incorporating risk matrix and fault tree analysis", Journal of Marine Science and Application, 2020, Vol.19, 155-172. (IF: 1.20)
10. Asuquo M.P., Wang J., Zhang L., Phylip-Jones G., "An integrated risk assessment for maintenance prediction of oil wetted gearbox and bearing in marine and offshore industries using a fuzzy rule base method", Proc IMechE Part M: Journal of Engineering for the Maritime Environment, 2020, Vol.234(2), 313–331. (IF: 1.531)
11. Chang C.H., Yang Z., Kontovas C., Yu, Q., "Evaluation of risk assessment in maritime autonomous systems in the UK", Reliability Engineering & System Safety, 2021, Vol.207, 107324. (IF: 5.04)
12. Chen J., Fei Y., Wan Z., Yang Z., Li H., Choi K.S., Xie X., "Allometric relationship and development potential comparison of ports in a regional cluster: A case study of ports in the Pearl River Delta in China", Transport Policy, 2020, Vol.80, 80-90. (IF: 3.382)
13. Fan S., Blanco-Davis. E., Zhang J., Bury A., Warren J., Yang Z., Yan X.P., Wang J., Fairclough S., "The role of the prefrontal cortex & functional connectivity during watchkeeping and collision avoidance during maritime operations: An fNIRS study", Brain and Behaviour, 2020, pp. e01910. (IF: 2.15)
14. Fan S.Q., Yang Z., Blanco-Davis E., Zhang J., Yan X.P., "Analysis of maritime transport accidents using Bayesian networks", Proceedings of the Institution of Mechanical Engineers, Part O: Journal of Risk and Reliability, 2020, Vol.234, 439-454. (IF: 1.602)
15. Fan S.Q., Blanco-Davis E., Yang Z., Zhang J., Yan X.P., "Incorporation of human factors into maritime accident analysis using a data-driven Bayesian Network", Reliability Engineering & System Safety, 2020, Vol.203, 107070. (IF: 5.040)
16. Fan S.Q., Zhang J., Blanco-Davis E., Yang Z., Yan X.P., "Maritime accident prevention strategy formulation from a human factor perspective using Bayesian Networks and TOPSIS", Ocean Engineering, 2020, Vol.210, pp. 107544. (IF: 3.068)
17. Huang D.Z., Hua Y., Loughney S., Blanco-Davis EE., Wang J., "Lifespan cost analysis of alternatives to global sulphur emission limit with uncertainties", Proc IMechE Part M: Journal of Engineering for the Maritime Environment, 2020, 1–10, doi: 10.1177/1475090220983140. (IF: 1.531)
18. Ishola I., Matellini D.B., Wang J., "A proactive approach to quantitative assessment of disruption risks of petroleum refinery operation", Safety Science, 2020, Vol.127, 1-12. 10.1016/j.ssci.2020.104666. (IF: 4.105)
19. Jiang M.Z., Lu J., Yang Z., Li J., "Risk analysis of maritime accidents along the main route of the Maritime Silk Road: a Bayesian network approach", Maritime Policy & Management, 2020, Vol.47, 815-832. (IF: 3.152)
20. Koh S., Zhou B., Fang H., Yang P., Yang Z., Yang Q., Guan L., Ji Z., "Real-time deep reinforcement learning based vehicle routing and navigation", Applied Soft Computing, 2020, Vol.96, pp. 106694. (IF: 6.03)
21. Kontovas C., Sooprayen K., "Maritime cargo prioritisation during a prolonged pandemic lockdown using an integrated TOPSIS-KNAPSACK technique: A case study on small island developing states - The Rodrigues Island", Sustainability, 2020, Vol.12, 7992, doi:10.3390/su12197992. (IF: 2.576)
22. Kontovas C.A., "Integration of air quality and climate change policies in shipping: The case of Emission Control Areas", Maritime Policy, 2020, doi:10.1016/j.marpol.2020.103815. (IF: 3.228)
23. Kot P., Shaw A., Jones K.O., Cullen J., Masn A., Al-Shamma'a A., "The feasibility of using electromagnetic waves in determining the moisture content of building fabrics and the cause of the water ingress", International Journal on Smart Sensing and Intelligent Systems, 2020, Vol.7(5), 1-5. (IF: n/a)
24. Li H., Liu J., Yang Z., Liu R., Wu K., Wan Y., "Adaptively constrained dynamic time warping for time series classification and clustering", Information Sciences, 2020, Vol.534, 97-116. (IF: 5.910)
25. Liu J., Liu X., Zhang Q., "A new training method for leg explosive power in taekwondo and its data-driven predictive

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* IF: Impact Factor.

models", Isokinetics and Exercise Science, 2020, Vol.28(4), 351-363. (IF: 0.474)

26. Liu J., Zhang Q., Liu X., "Understanding handling performance of rugby balls under wet conditions: Analysis of finger-ball friction", International Journal of Performance Analysis in Sport, 2020, Vol.20(5), 782-799. (IF: 1.518)

27. Makki A., Nguyen T.T., Ren J., Al-Jumeily D., Hurst W., "Estimating road traffic capacity", IEEE Access, 2020, Vol.8, 228525 - 228547. (IF: 3.8).

28. Malkeson S.P., Ahmed U., Pillai A.L., Chakraborty N., Kurose R., "Evolution of surface density function in an open turbulent jet spray flame", Flow, Turbulence and Combustion, 2021, Vol.106, 207–229, (Published Online 2020). (IF: 2.472)

29. Malkeson S.P., Ahmed U., Turquand d'Auzay C., Pillai A.L., Chakraborty N., Kurose R., "Displacement speed statistics in an open turbulent jet spray flame", Fuel, 2021, Vol.286(1), (Published Online 2020). (IF: 5.128)

30. Paraskevadakis D., Bury A., Ren J., Wang J., "A services operations performance measurement framework for multimodal logistics gateways in emerging megaregions", Transportation Planning and Technology, 2020, Vol.44, Issue 1, 63-92. (IF: 0.804)

31. Psaraftis H.N., Kontovas C.A., "Influence and transparency at the IMO: the name of the game", Maritime Economics and Logistics, 2020, doi:10.1057/s41278-020-00149-4. (IF:1.750)

32. Psaraftis H.N., Kontovas C.A., "Decarbonization of maritime transport: Is there light at the end of the tunnel?", Sustainability, 2020, Vol.13(1), doi:10.3390/su13010237. (IF: 2.576)

33. Sabe M., Kontovas C.A, Pendleton L. (2020), "Ship-whale collisions: the probability and costs of ship damages", Science of the Total Environment, 2020, Vol.713, doi:10.1016/j.scitotenv.2020.136643. (IF:6.651)

34. Sarıalioglu S., Ugurlu O., Aydın M., Vardar B., Wang J., "A hybrid model for human-factor analysis of engine-room fires on ships: HFACS-PV & FFTA", Ocean Engineering, 2020, Vol.217, doi: 10.1016/j.oceaneng.2020.107992. (IF: 3.068)

35. Seddighi M., Allanson D., Rothwell G., Takrouri K., "Study on the use of a combination of IPython Notebook and an industry-standard package in educating a CFD course", Computer Applications in Engineering Education, 2020, Vol.28, 952–964. (IF: 0.856)

36. Setiadi H., Jones K.O., Nugroho T.A., Abdillah M., Trilaksana H., Amrillah T., "Design of Spark ignition engine speed control using bat algorithm", International Journal of Electrical and Computer Engineering, 2020, Vol.11(1), 794-801. (IF: n/a)

37. Shen L.X., Wang Y.D., Liu K.P. and Yang Z., "Synergistic path planning of multi-UAVs for air pollution detection of ships in ports", Transportation Research Part E: Logistics and Transportation Review, 2020, Vol.144, pp. 102128. (IF: 4.690)

38. Su M., Luan W.X., Fu X.W., Yang Z. and Zhang R., "The competition effects of low-cost carriers and high-speed rail on the Chinese aviation market", Transport Policy, 2020, Vol.95, 37-46. (IF: 3.382)

39. Suthiwartnarueput K., Lee T.W.P, Lin C.W., Visamitanan K., Yang Z., Ng A.K.Y., "Evaluation of key success factors of port-city waterfront development", International Journal of Shipping and Transport Logistics, 2020, Vol.12, No.3, 174-196. (IF: 1.30)

40. Tabrizian A., Tatar M., Masdari M., Eivazi H., Seddighi M., "An experimental study on boundary layer transition detection over a pitching supercritical airfoil using hot-film sensors", International Journal of Heat and Fluid Flow, 2020, Vol.86. (IF: 2.073)

41. Ugurlu F., Yıldız S., Boran M., Ugurlu O., Wang J., "Analysis of fishing vessel accidents with Bayesian network and Chi-square methods", Ocean Engineering, 2020, Vol.198, doi: 10.1016/j.oceaneng.2020.106956. (IF: 3.068)

42. Uğurlu O., Yildiz S., Aydin M., Aydin T., Kaptan M., Wang J., "Analysis of occupational burnout utilising Maslach Inventory: A case study of Turkish male seafarers", Maritime Policy & Management, 2020, doi: 10.1080/03088839.2020.1843725. (IF: 3.152)

43. Uğurlu O., Yıldız S., Loughney S., Wang J., Kuntchulia S., Sharabidze I., "Analysing of collision, grounding and sinking accident occurring in the black sea utilizing HFACS and Bayesian networks", Risk Analysis, 2020, Vol.40, No.12,. Doi: 10.1111/risa.13568.

44. Vu V.T., Bui L.T., Nguyen T.T., "A competitive co-evolutionary approach for the multi-objective evolutionary algorithms", IEEE Access, 2020, Vol.8, 56927 – 56947. (IF: 3.8)

45. Wang T., Qu Z, Nichol T., Yang Z., Dimitriu D., Clarke G., Ge Y.E., "Climate change research on transportation systems: Climate risks, adaptation and planning", Transportation Research Part D: Transport Environment, 2020, Vol. 88, pp. 102553. (IF: 4.577)

46. Wang T., Qu Z, Nichol T., Yang Z., Dimitriu D., Clarke G., Bowden D., "Impact analysis of climate change on rail systems for adaptation planning: A UK case", Transportation Research Part D: Transport Environment, 2020, Vol.83, pp. 102324. (IF: 4.577)

47. Wang L., Li Y., Wan Z., Wang T., Guan K., Yang Z., "Use of AIS data for performance evaluation of ship traffic with speed control", Ocean Engineering, 2020, Vol. 204, pp. 107259. (IF: 3.068)

48. Wang X.J., Liu Z., Zhao Z., Wang J., Loughney S., Wang H., "Passengers' likely behaviour based on demographic difference during an emergency evacuation in a Ro-Ro passenger ship", Safety Science, 2020, Vol.129, doi: 10.1016/j.ssci.2020.104803. (IF: 4.105)

49. Wang Y.F., Wang L.T., Jiang J.C., Wang J., Yang Z.L., "Modelling ship collision risk based on the statistical analysis of historical data: A case study in Hong Kong waters", Ocean Engineering 2020, Vol.197. 10.1016/j.oceaneng.2019.106869. (IF: 3.068)

50. Wang Y.H., Zhang F., Yang Z.S., Yang Z., "Incorporation of deficiency data into the analysis of the dependency and interdependency among the risk factors influencing port state control inspection", Reliability Engineering & System Safety, 2020, Vol.106, pp. 107277. (IF: 5.040)

51. Xi Y.T., Hu S.P., Yang Z., Fu S.S., "The effect of social cognition and risk tolerance on marine pilot safety behaviour", Maritime Policy and Management, 2020, https://doi.org/10.1080/03088839.2020.1847338. (IF: 3.152)

52. Xing Y.W., Yang H.L., Yang Z., "Sailing speed and fleet deployment optimisation for intercontinental container line shipping consideration cargo time value", Transportation Journal, 2020, Vol.59, No.3, 254-278. (IF: 1.059)

53. Yang Y., Bashir M., Wang J., Yu J., Li C., "Performance evaluation of an integrated floating energy system based on coupled analysis", Energy Conversion and Management, 2020, doi: 10.1016/j.enconman.2020.113308. (IF:8.208)

54. Yang Y., Bashir M., Li C., Michailides C., Wang J., "Mitigation of coupled wind-wave-earthquake responses of a 10 MW fixed-bottom offshore wind turbine", Renewable Energy, 2020, Vol.157, 1171-1184, doi.org/10.1016/j.renene.2020.05.077. (IF: 6.274)

55. Yang Y., Bashir M., Wang J., Michailides C., Loughney S., Armin M., Hernández S., Urbano J., "Wind-wave coupling effect on the fatigue damage of tendons for a 10 MW TELWIND floating offshore wind turbine", Ocean Engineering, 2020, Vol.207. Doi: 10.1016/j.oceaneng.2020.107909. (IF: 3.068)

56. Yang Y., Bashir M., Michailides C., Li C., Wang J., "Development and application of an aero-hydro-servo-elastic coupling framework for analysis of floating offshore wind turbines renewable energy, Renewable Energy, 2020, Vol.161, 606-625, doi: 10.1016/j.renene.2020.07.134. (IF: 6.274)

57. Yang Z., Poo M.C.P., Galatioto F., Dimitriu D., Qu Z., Rushton C., Lee P.T.W. and Guan B. (2020), "Key Green Performance Indicators (KGPIs) for vehicle cleanliness evaluation: A buyer choice", Transportation Research Part D: Transport and Environment, Vol. 87, pp. 102505. (IF: 4.577)

58. Yang Z.S., Yang Z. and Teixeira A.P. (2020), "Comparative analysis of the impact of new inspection regime on port state control inspection", Transport Policy, Vol. 92, pp. 65-80. (IF: 3.382)

59. Yazdani D., Omidvar M.N., Branke J., Nguyen T.T., Yao X., "Scaling up dynamic optimization problems: A divide-and-conquer approach", IEEE Transactions on Evolutionary Computation, 2020, Vol.24(1), 1-15. (IF: 11.17).

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61. Yu, Q., Liu, K., Chang, C.H., and Yang, Z. (2020) "Realising advanced risk assessment of vessel traffic flows near offshore wind farms", Reliability Engineering and System Safety, Vol. 203, 107086. (IF: 5.04)

62. Yuan Z., Liu J., Liu Y., Yuan Y., Zhang Q., Li Z., "Fitting Analysis of Inland Ship Fuel Consumption Considering Navigation Status and Environmental Factors", IEEE Access, 2020, Vol.8, 187441-187454. (IF: 3.745)

63. Yuan Z., Liu J., Liu Y., Zhang Q., Liu R., "A Multi-task Analysis and Modelling Paradigm using LSTM for Multisource Monitoring Data of Inland Vessels", Ocean Engineering, 2020, Vol.213, 107604. (IF: 3.068)

64. Yuan Z., Liu J., Zhang Q., Liu Y., Yuan Y., Li Z., "A practical estimation method of inland ship speed under complex and changeful navigation environment", IEEE Access, 2021, doi: 10.1109/ACCESS.2021.3052473. (IF: 3.745)

65. Yuan Z., Liu J., Zhang Q., Liu Y., Li Z., "Prediction and optimisation of fuel consumption for inland ships considering real-time status and environmental factors", Ocean Engineering, 2021, Vol.221, 108530. (IF: 3.068)

66. Zhang D.H.. Qu Z.H., Wang W.X.. Yu J.G., Yang Z., "New uncertainty modelling for cargo stowage plans of general cargo ships", Transportation Research Part E: Logistics and Transportation Review, 2020, Vol.144, pp. 102151. (IF: 4.690)

67. Zhang W.B., Zou Z.Y., Wang J., Du L., "Multi-ship following operation in ice-covered waters with consideration of inter-ship communication", Ocean Engineering, 2020, Vol.210, 10.1016/j.oceaneng.2020.107545. (IF: 3.068)

68. Zhang L., Lu J., Yang Z., "Optimal scheduling of emergency resources for major maritime oil spills considering time-varying demand and transportation networks", European Journal of Operational Research, 2020, https://doi.org/10.1016/j.ejor.2020.12.040. (IF: 4.213)

Other academic journal papers
69. Bury A., Saeed F., Khalique A., "Simulator-based learning, the Dunning-Kruger effect and the newly-'qualified' Officer of the Watch", Seaways: The International Journal of The Nautical Institute, December 2020, 14-16.

Refereed conference papers
70. Chang C., Kontovas C., Qing Y., Yang Z., "Risk assessment of maritime autonomous surface ships", International Association of Maritime Economics Annual Conference, 10-14 June 2020, Hong Kong (Virtual conference due to Covid-19).

71. Chang C.H., Shi W., Zhang W., Park, C., "Evaluating cybersecurity risks in the maritime industry", ALRT, 19 November 2020, Launceston, Tasmania, Australia.

72. Doung P. , Sirovetnukul R. , Ren J., "Simulation-based Assembly Line Balancing in U-shaped, Parallel U-shaped, and Parallel Adjacent U-shaped Layouts", IEEE International Conference on Industrial Engineering and Engineering Management (IEEM), IEEE, 2020, ISBN: 978-1-5386-7220-4, doi: 10.1109/ieem45057.2020.930994.

73. Ge X., Qu J., Guo F.B., "On major issues and countermeasures of the regeneration of former industrial sites in China", 2020, Vol.33, Proceedings of the 3rd International Conference on Advances in Management Science and Engineering (IC-AMSE 2020), 6 April 2020, Atlantis Press: doi: https://doi.org/10.2991/aebmr.k.200402.024.

74. Gbako S., Paraskevadakis P., Ren J., Wang J., "A review of the challenges of utilising inland waterways for freight transport and future perspectives for the UK", LRN2020: Logistics Research Network Annual Conference 2020, September 9-11, 2020, PTC Building, Cardiff Business School, Cardiff, UK.

75. Loughney S., Wang J., "Development of an algorithm to convert linear belief function inputs to exponential conditional probability functions for multiple method applications", The 30th European Safety and Reliability Conference and the 15th Probabilistic Safety Assessment and Management Conference (ESREL 2020 and PSAM 15), Venice, Italy, 1-6 Nov. 2020.

76. Loughney S., Wang J., Bashir M., Armin M. , Yang Y., "Application of a multiple-attribute decision-analysis methodology for site selection of floating offshore wind farms off the west coast of Ireland", RENEW 2020 - 4th International Conference on Renewable Energies Offshore, 12 - 15 October 2020, Lisbon, Portugal.

77. Mohamad U., Qu Z., Chang C. and Yang Z., "A new fuzzy Bayesian approach for two-stroke engine operational health analysis", European Safety and Reliability Conference (ESREL2020), 1-6 November 2020, Venice, Italy.

78. Novoth S., Zhang Q., Ji K., Yu D., "Distributed formation control for multi-vehicle systems with splitting and merging capability" 59th IEEE Conference on Decision and Control, December 14-18, 2020.

79. Onakoya R.. Qu Z., Yang Z., Nguyen H.T., "Advanced risk model for the safety evaluation of food transport logistics", 15th Global Congress on Manufacture and Management (GCMM), 25-27 November 2020, Liverpool, UK.

80. Poo C.P., Yang Z., "Assessing the climate resilience of the global shipping network by an optimisation model", International Association of Maritime Economics Annual Conference, 10-14 June 2020, Hong Kong (Virtual conference due to Covid-19).

81. Poo C.P., Qu Z., Dimitiu D. and Yang Z., "Climate change adaptation for seaports by a climate resilience indicator framework", European Safety and Reliability Conference (ESREL2020), 1-6 November 2020, Venice, Italy.

82. Qu Z., Abujaafar K., Wang J., Nazir S., Mallam S.C., Blanco-Davis E., Guo F.B., Sivori H., Symes S., Yang Z., "Advanced Bayesian model to quantify the adequacy of organisation for human reliability: A maritime case", 15th Global Congress on Manufacture and Management (GCMM), 25-27 November 2020, Liverpool, UK.

83. Sander L., Guo F.B., Yang Z., Blanco Davis E., "Does being human cause human errors? Consideration of human centred design in ship bridge design", 11th International Conference on Applied Human Factors and Ergonomics, 25-29 July 2020, New York, USA.

84. Wan C.P., Tao J.L., Wu J., Zhang D, Yang Z., "Evaluating recovery strategies for the disruptions in liner shipping networks: A resilience perspective", Asian Logistics Round Table 2020 Conference, Tasmania, November 19-20, 2020 (Virtual conference due to Covid-19).

85. Wan C.P., Yang Z., Yang Z., "Using Bayesian network-based TOPSIS to aid the selection of detention risk control strategies under PSC inspections", International Association of Maritime Economics Annual Conference, 10-14 June 2020, Hong Kong (Virtual conference due to Covid-19).

86. Wang Y., Chen P, Wu B., Yang Z., "A trustable architecture over blockchain to facilitate maritime administration for autonomous shipping ecosystem, European Safety and Reliability Conference (ESREL2020), 1-6 November 2020, Venice, Italy.

87. Shen L.X., Shi X.W., Yang Z., "Evaluation Transportation Routes Between China and Vietnam based on Delphi & CFPR", 10th International Conference on Logistics, Informatics and Service Science (LISS2020), 25-28 July 2020, Budapest, Hungry (Virtual conference due to Covid-19).

88. Wang L., Ren J., Wang J., Morecroft C., Paraskevadakis D., Prapaspongsa T., "Sustainable healthcare supply chain and risk management by using novel decision support tools", the 8th World Sustainability Forum, 15/09/2020 - 17/09/2020, Switzerland, ID: sciforum-034350.

89. Wang Y.H., Zhang F., Yang Z.S., Yang Z., "A dynamic perspective of the factors influencing Port State Control inspections", 10th International Conference on Logistics, Informatics and Service Science (LISS2020), 25-28 July 2020, Budapest, Hungry (Virtual conference due to Covid-19).

90. Yang Y., Bashir M., Sakaris C., Loughney S., Wang J., Michailides C., Li C., "Tuned mass damper effects on the tendon responses of a novel 10 MW multi-body floating offshore wind turbine platform", RENEW 2020 - 4th International Conference on Renewable Energies Offshore, 12 - 15 October 2020, Lisbon, Portugal.

Other publications

91. Ge X., Jiao L,, Qu J., Guo F.B., "Sustainable urban regeneration based on industrial heritage conservation in Dalian, China". Test Engineering and Management, Issue: May-Jun 2020, 19353 – 19359.

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Appendix 2: LOOM monthly seminars in 2020

Time: 10.00-11.15, first Wednesday of each month from February 2020.
Venue: Room 1.21, LOOM Research Institute, James Parsons Building, Byrom Street, Liverpool John Moores University, Liverpool, L3 3AF, UK

Each internal speaker will give a talk of 30 minutes (excluding question time) while an external speaker is usually given 60 minutes (excluding question time).

In 2020, LOOM planned to deliver 12 research seminars. However only 2 research seminars were delivered due to COVID 19.

5th Feb, 10-11am, Room 1.21, James Parsons Building.

Dr Ran Wang

Title:	"Data analytics and optimisation to understand the impact of slippery rail in Autumn on rail performance"
Abstract:	"Slippery rail condition (low adhesion) may cause severe safety and reliability problems to the railway industry. It is a complex challenge to accurately predict the low adhesion conditions and mitigate their negative impact. This talk summarises some work done in the LOOM institute to deepen our understanding towards low adhesion and provide better decision support for mitigating its effect."

4th March, 10-11am, Room 1.21, James Parsons Building.

Xinjian Wang, Visiting researcher from Dalian Maritime University, China

Title:	"Research on passenger ship evacuation based on personnel characteristics"
Abstract:	"The passenger ship is an important part of the maritime transport industry, although serious accidents involving passenger ships are rare, the consequences can be catastrophic. In such kind of accident, an effective evacuation of passengers is a last resort to reduce the accident loss. The purpose of this study is to study the behavioral characteristics and movement characteristics of passengers on large passenger ships during an emergency evacuation. Firstly, a questionnaire survey was designed to demonstrate the current levels and status of passenger safety awareness, the perception of emergency wayfinding tools and demographic differences. Secondly, another questionnaire survey was designed to study the likely behaviors of passengers during emergency evacuation and the demographic differences among these likely behaviors. Thirdly, a series of experiments were carried out to study the influence of ship motion on individual walking speed, the relationship between freely and fast walking speed, and the walking speed difference between different decks. Finally, simulation and statistical analysis were used to analyze the effects of various influencing factors on the evacuation performance (such as evacuation time and number of deaths), and form a passenger ship evacuation strategy on a certain route."

4th March, 10-11am, Room 1.21, James Parsons Building.

Fifi Shahedan, Visiting researcher from the University of Perlis, Malaysia

Title:	"Environmental friendly repair and retrofitting solutions for Marine Infrastructure using 'Geopolymer Concrete"
Abstract:	"Maritime infrastructure has exposed to huge risk of corrosion that contributed to the damage over its service life. The highly aggressive condition in marine environments mostly subjected to the presence of chlorides which one of the major forms of environmental attack is chloride ingress. . This may lead to early repair or premature replacement of the structure. Concerning of the durability issues facing in marine environment as regards corrosion Geopolymer concretes have emerged as novel engineering materials with the potential to form a substantial element of an environmentally sustainable construction. Geopolymer has received much attention as green alternative to Ordinary Portland cement (OPC). Geopolymer are generally reported to be much more sustainable than Portland cement, in terms of reduced production energy requirement and lower CO_2 emissions. With correct mix design and formulation development, geopolymer concrete can provide excellent mechanical properties as other options to OPC concrete and potentially be used as environmental friendly repair and retrofitting solutions for marine infrastructure."

Dr. Sam Tammas-Williams, Lecturer in Materials at LJMU

Title:	"E3D characterisation of metal additive manufactured parts: from manufacturing to failure"