2019 Annual Research Outcome Report of the Liverpool Logistics, Offshore and Marine (LOOM) Research Institute

Contact details

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LOOM members in 2019

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

LOOM researchers (doctoral/postdoctoral) in 2019

Dr. D. Agarwal
Ala Al-Kafri
Y. Ancele
G. Asuelimen
K. Biela
W. Bin Abdul Halim
Dr. A. Bury
S. Caldwell
S. Campbell
S.L. Chandler Črnigoj
O. Chukwuka
A. Cliffe
N. Cook
J. Cutler
I. Deplano
J. Ender
A. Ehiagwina
Miss S.Q. Fan
S. Gbako
Ms X. Ge
S. Hassan
M. Jenkins
I. C. Ikewete
K. Ji
B. Kelly
C. Kelly
H. Khansaheb
S. Jones
Dr. C. Lersteau
Dr. S. Loughney
A. Makki

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

Other members involved in PhD supervision at LOOM

Dr. A. Cunningham (AC), Trelleborg Offshore UK Ltd, UK
Prof. T. Bektas, University of Liverpool (TB)
Mr. P. Davies (PD)
Prof. Y. Jin (YJ), Surrey University
Ms B. Kelly (BK)
Professor Roland Larek (RL), University of Applied Sciences, Germany
Dr. Constantine 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

Visiting researchers

Prof Dr Ab S. bin Abd Kader
Dr Yanyi Chen
Dr. D.Z. Huang
H. Li
M. Masdari
Dr. Trakarn Prapaspongsa
Ms Noor Fifinatasha Shahedan
X.J. Wang
Dr. Y. Wang
Y. Yang
Zhi Yuan
Qing Yu

Visiting professors

RAEng Professor D. Cooper, Risktec
RAEng Professor Paul Davies, LR

It has been identified that the LOOM's research emphasis in 2020 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 2019)

The following are the outputs published in 2019 (for details, see Appendix 1):
- 4 books/edited books/published reports.
- 1 book chapter.

- 36 SCI-cited refereed journal papers (incl. ESCI).
- 27 refereed conference papers.
- 6 other publications.

2. Doctoral, postdoctoral and international research visiting projects (completed, on-going and started in 2019)

2.1 Research projects completed in 2019
PhD projects
1. Dr. W. Abdul Halim, "Port security analysis" (2019). (ZY, *et al*)
2. Dr. Y. Ancele, "Logistics routing in the physical Internet context" (2019), funded by LJMU Scholarship. (DBM, *et al.*)
3. Dr. A. Bury, "Freight transport modal choice in North West England's Atlantic Gateway" (2011-2019), funded by the EU. (AW, *et al.*)
4. A. Cliffe, "Use of drones to enhance geography education fieldtrips" (2019). (KJ, *et al.*)
5. Dr. R. Wang, "Discrete-event simulation for the bin-packing and berth planning optimisation for ports" (2019), funded by LJMU. (TTN, *et al.*)
6. Dr. D. Yazdani, "Dynamic and robust optimisation" (2019), funded by LJMU Scholarship. (TTN, *et al.*)

Postdoctoral projects
7. Ala Al-Kafri, "Information system for train stations" (2019), funded by the InnovateUK. (TTN, *et al.*)
8. I. Deplano, "Anticipating and mitigating reactionary delays in rail" (2018-19), funded by the Rail Safety and Standard Boards. (TTN, *et al.*)
9. Dr. C. Lersteau, "Anticipating and mitigating reactionary delays in rail" & "Reactionary delays for trains" (2018-19), funded by the Rail Safety and Standard Boards. (TTN, *et al.*)
10. Dr. S. Loughney, "Ship/offshore installation collision analysis" (2017-2019). (JW)
11. Dr. Z. Yang, "Cycling safety analysis" (2019), funded by UK DfT. (ZY *et al.*)

Visiting research projects
12. Dr Yanyi Chen, "Carrying capacity of traffic system" (12/2018-12/2019), from Wuhan University of Technology, funded by China Scholarship Council. (RD*)*
13. Dr. Paul Davies, "Risk assessment and marine technology" (2016-2019), funded by the Royal Academy of Engineering via its Visiting Professorship Scheme. (JW)
14. H. Li "Clustering of shipping routing for risk analysis" (05/2018-05/2019), from Wuhan University of Technology, funded by China Scholarship Council (ZY *et al.*)
15. Dr. M. Masdari "Unsteady turbulent flow in pipe flows" (8/2018-10/2019), from the University of Tehran, funded by Iran Ministry of Science Research and Technology. (MS, *et al.*)
16. Dr. Trakarn Prapaspongsa, "Sustainability assessment of maritime transport systems" (2019), from University of Mahidol, Thailand and funded by EU. (EBD)
17. Dr. Yanfu Wang, "Emergency Decision Support System for Offshore Safety", from China University of Petroleum and funded by the China Scholarship Council (2018-2019). (SM and JW)
18. Prof Dr Ab Saman bin Abd Kader, "Risk based inspection and verification of maritime systems" (11-12/2019), from Technical University of Malaysia and funded by EU. (SL & JW)
19. Q. Yu, "Realising advanced risk assessment of vessel traffic flows near offshore wind farms" (10/2018-10/2019), from Wuhan University of Technology and funded by the China Scholarship Council. (CHC and ZY)

2.2 On-going research projects in 2019
Doctoral projects
20. 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.*)
21. G. Asuelimen, "An enhanced risk assessment model for offshore seismic survey in hostile environments: A case study of Arctic oil and gas exploration" (2016-2020), funded by the Saudi government. (EBD, *et al.*)
22. S.L. Chandler Črnigoj, "Binaural sound applications for sensor technology" (2016-2020). (KJ, *et al.*)
23. I. Deplano, "Automation technologies for logistics in the Physical Internet context" (2016-2020), funded by LJMU Scholarship. (TTN, *et al.*)
24. A. Ehiagwina, "Agent based modelling of port traffic" (2018-2021), funded by LJMU. (IJ, *et al.*)
25. J. Ender, "A research into interaction among humans, machines and networks across the digitised industry at present and in the future" (2017-2020), funded by HS Wismar - University of Applied Sciences, Germany. (FBG, *et al.*)
26. Miss S. Fan, "The influence of seafarer's emotion on navigation safety" (2017-2020), dual PhD, funded by Wuhan University of Technology and LJMU. (EBD, *et al.*)
27. 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.*)
28. I. C. Ikewete, "A risk-based framework for design, inspection and maintenance of offshore wind farm turbines" (2012-2020). (EBD, *et al.*)
29. K. Ji, "Swarmintelligence-based decision-making for many-agent autonomous systems", funded by LJMU and CSC (2017-2020). (QZ, *et al.*)
30. B. Kelly, "An analysis into the process of selection and retention of deck cadets in the UK Merchant Navy" (2016-2021). (EBD, *et al.*)
31. C. Kelly, "Investigation into the uses of life cycle analysis as an alternative method of certifying tidal power schemes" (2016-2020), funded by a scholarship from the Faculty of Engineering and Technology. (EBD, *et al.*)
32. A. Makki, "Studying the impact of LNG container tanks on LNG logistics supply chains using simulation" (2016-2020). (TTN, *et al.*)
33. I. Nawaz, "Risk-based verification of offshore installations on the United Kingdom continental shelf" (2012-2020), funded by Lloyd's Register. (DBM, *et al.*)
34. S. Novoth, "Formation planning and control of swarm autonomous robotic systems" (2018-2021), funded by LJMU Scholarship. (QZ, *et al.*)

35. H. Oraith, "The impact of human element factors on pilotage operations safety" (2016-2020), funded by the Libyan Government. (EBD, *et al.*)
36. P. Papageorgiou, "A novel framework for maritime security assessments" (2017-2020). (CK, *et al.*)
37. M. Poo, "Seaport and airport climate adaptation" (2018-2020), funded by LJMU and DfT. (ZY, *et al.*).
38. 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" (2017-2020), funded by LJMU scholarship. (DBM, *et al.*)
39. S. Symes, "Ship simulator-based seafarers' skill acquisition incorporating the use of Functional-Infrared Spectroscopy (fNIRS)" (2017-2020), funded by LJMU scholarship. (ZY, *et al.*)
40. K. Takrouri, "Study of unsteady turbulence and drag reduction over patterned surfaces" (2016-2020). (MS, *et al.*)
41. P. Ugedi, "Assessing the effectiveness and implementation of the SOLAS Verified Gross Mass (VGM) Regulation" (2016-2020), funded by the Faculty and the Nigerian Maritime Administration and Safety Agency. (CK, *et al.*)
42. M. Usman, "Health management of marine engines" (2015-2020), funded by Lloyd's Register and LJMU. (ZY, *et al.*)

On-going postdoctoral project
43. Dr. Y. Yang, "Integrity modelling of floating offshore wind installations" (2018-2020), funded by EU. (MB, *et al.*)

Visiting research projects
44. Dr. D. Cooper, "Safety and Engineering Risk Management" (2018-2021), Visiting Professor from Risktec and funded by the Royal Academy of Engineering. (DBM)
45. H. Li, "Clustering of shipping routing for risk analysis" (05/2018-05/2019), from Wuhan University of Technology, funded by China Scholarship Council. (ZY, *et al.*)

2.3 Research projects started in 2019
Doctoral projects
46. Miss K. Biela. "Voice tampering, alterations and audio deepfakes: standardisation of detection methods" (2019-2022). (KOJ, *et al.*)
47. 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.*)
48. J. B. Campbell, "A study of turbulence and heat transfer in pulsating flows", funded by LJMU FET Scholarship (2019-2022). (MS, *et al.*)
49. O. Chukwuka, "Risk analysis for emergency supply chain with particular focus on intermodal transport" (2019-2022), funded by Nigeria . (JR, *et al.*)
50. 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.*)
51. 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*)
52. M S. Gbako, "Benchmarking the current state of the art of Inland Waterways" (2019-2022). (DP, *et al.*)
53. M. Jenkins, "An investigation and evaluation of workplace substance misuse programmes and compliance with drug and alcohol policy" (2019-2024). (DBM, el at.)
54. 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.*)
55. H. Khansaheb, "Solutions to the sedimentation and maintenance of semi-enclosed channels (2019-2022). (IJ, *et al.*)
56. 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.*)
57. M. Oregbeyiwa, "Increasing energy efficiency in ports" (2019-2022). (CHC, *et al.*)
58. C. Park, "Cybersecurity risk assessment in the maritime industry" (2019-2022). (CHC, *et al.*)
59. J. Reed-Jones. "Binaural Sound Localisation for Smart Sensors using Hybrid Neural Networks" (2019-2022), funded by LJMU Scholarship. (KOJ, *et al.*)
60. O. Salih, "Investigation of an intelligent shunt for Hydrocephalus monitoring" (2018-2021). (MM, *et al.*)
61. 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*)
62. 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.*)
63. A. Spiteri, "Ship hull drag reduction using air cousin induced by a modified hull" (2019-2022). (MA, *et al.*)
64. S. Toh, "Computational wear analysis for orthopaedic applications" (2019-2022). (AA, *et al.*)
65. S. Waddington, "Offshore decommissioning, risk assessment template using with Monte Carlo analysis" (2019-2023). (JW *et al.*)
66. Miss X. Zhan, "What emotion design can help urban regeneration in particular post-industrial zones" (2019-2022). (FBG, *et al.*)

Postdoctoral projects
67. Dr. D. Agarwal, "Rotorcraft simulation fidelity" (2019-2022), funded by EPSRC. (LL)
68. N. Cook, "Information system for train stations" (2019-20), funded by the InnovateUK. (TTN, *et al.*)
69. I. Deplano, "Data analytics to study the impact of slippery rail" (2019-20), funded by the RSSB. (TTN, *et al.*)
70. A. Makki, "Information system for train stations" (2019-20), funded by the InnovateUK. (TTN, *et al.*)
71. Dr. Michailides Constantine, "Structural health modelling of floating offshore wind turbines" (2018-2020), funded by EU. (JW, *et al.*)
72. Dr. C. Sakaris, "Array health diagnosis and prognosis of floating offshore wind installations" (2019-2020), funded by EU. (MB, *et al.*)
73. G. Tasapparalas, "IoT system for cycling/walking" (2019-21), funded by the ERDF. (TTN, *et al.*)
74. Dr. R. Wang, "Data analytics to detect potholes on road" & "Data analytics to study the impact of slippery rail" (2019-2020), funded by the DfT & RSSB. (TTN, *et al.*)

Visiting research projects
75. Dr. Dao Zheng 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.*)
76. Ms Noor Fifinatasha Shahedan, "Concrete performance tests and analysis" (Nov 2019 to March 2020), funded by EU Prigeoc. (Bras, *et al.*)
77. 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.*)
78. 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.*)

3. LOOM monthly seminars in 2019

12 LOOM monthly seminars were organised in 2019. The following external speakers delivered their presentations at LOOM's monthly seminars:
− Dr. Dong Yang, Assistant Professor, Department of Logistics and Maritime Studies, Director of International Shipping and Transport Logistics Master Program, Deputy Director of Shipping Research Centre, Hong Kong Polytechnic University
− Professor Harilaos N. Psaraftis, Department of Management Engineering, Technical University of Denmark, Denmark.
− Dr. Trakarn Prapaspongsa, Assistant Professor, Faculty of Engineering, Mahidol University, Thailand.
− Dr. Yan Fu Wang, Associate Professor, China University of Petroleum, China.

The 2019 LOOM monthly seminars are detailed in Appendix 2.

4. Research grants in 2019

4.1 External grants
Grants completed in 2019
- CILT - Risk evaluation of autonomous surface ships (2019-2020), £7,500 (CHC)
- ESF - Maritime Superskills (2017-2019) £460,000 (IJ, *et al.*)
- Royal Acad. of Eng. - VP in Maritime technology (2016-19) £30,000 (JW, *et al.*)
- Iran Ministry of Science Research and Technology (2019) £500 (MS, *et al.*)
- Computational resources (ARCHER, 2019) £17,000 (MS)
- RSSB – Anticipating/mitigating rail delays (2018-19) £86,000 (TTN, *et al.*)
- SeaConAZ - Exploring sea containers (RC Norway, 2015-19) £30,000 (out of £700,000) (ZY, *et al.*)

On-going grants in 2019
- EU ERDF Interreg - Atlantic Blue Port Services (2017-2020) €185,400 (CK, *et al.*)
- RAEng., VP in Risk Management (2018-2021) £30,000 (DBM, *et al.*)
- AHRC-Newton fund: Urban revitalisation (2018 – 2021) £249,290 (FBG, *et al*)
- Research In geopolymer concretes (EU H2020, 2016-2020) €180,000 (out of €516k) (JW, *et al.*)
- H2020 RESET – Rel. and Safety Eng. and Tech. (2017-2021) €1,471,500 (JW, *et al.*)
- PTDF - Onshore pipeline safety assessment (2017-2020) £15,000 (JW, *et al.*)
- EU Interreg - ARCWIND - Floating wind energy (2017-2020) €400,437 (out of €4m) (JW, *et al.*)
- Resilience of offshore wind energy platforms, Royal Soc. £12,000 (JW, *et al.*)
- UK EPSRC - Rotorcraft simulation fidelity (2018-2022) £365,697 (LL)
- EU ERDF – LCR Green Sustainable Corridors (2018-2021) £673,000 (out of £8.35m) (TTN, *et al.*)
- EU H2020 – Food Supply Chains (2018-2022) €189,000 (ZY, *et al.*)
- UK EPSRC – Vehicle Cleanliness (2018-2021) £50,000 (ZY)
- UK DfT – Cycling risk prediction (2018-2020) £55,000 (ZY, *et al.*)

Grants started in 2019
- IAMU - Cybersecurity in the maritime industry (2019-2020), $20,000 (CHC)
- EU H2020, REMESH – Emergency Resources Chain (2019-2022) €1,300,000 (JR, *et al.*)
- EU, RoCS - Rotorcraft Certification by Simulation (2019-2022) €140,000 (out of €3m) (LL)
- CSC - Supply chain research (2017-20) £32,000 (QZ, *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.*)
- RSSB – ANTI-SLIP – forecasting adhesion (2019-2020) £99,000 (TTN, *et al.*)
- InnovateUK & DfT – Customer information system (2019-2020) £265,000 (TTN, *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.*)

Grants awarded in 2019
- IAMU - Organizational Development Project (2020 – 2021) $28,676 (IJ, *et al.*)
- EPSRC - Modelling of Turbulent Pulsating Flow (2020 – 2022) £259,481 (MS, *et al.*)
- EU Horizon 2020 – Offshore fire emergency systems (2020-2022) €224,934 (JW, *et al.*)
- Innovate UK –Flexible Manufacturing (2020-2022) £120,000 (RD, *et al.*)
- IAMU - Maritime Safety Optimization (2020 – 2021) $20,000 (SL, *et al.*)
- DfT T-TRIG - Mind My Bumpy Ride (2020) £30,000 (TTN, *et al.*)
- ERC – Container transport resilience (2020-2025), €1,990,000 (ZY)

5. Evidence of national and international peer esteem in 2019

a. Invited plenary addresses/keynote paper/presentation at international conferences/research seminar
− Chang C.H., "Autonomous ships and the challenges", Invited as keynote speaker, Taiwan Scholar Workshop, Manchester, 15 Jun 2019.

– Lu L., "Rotorcraft simulation fidelity for low speed manoeuvring using 'additive' system identification", keynote speaker, 45th European Rotorcraft Forum, Warsaw, Poland, 17-20 September, 2019.
– Wang J. (with B. Matellini), "Risk-based verification (RBV) of large engineering systems such as offshore oil and gas installations", Annual Conference of the Institute for Quality and Reliability (IQR), Tsinghua University's Graduate School at Shenzhen, Shenzhen, P.R. China, 8-9 June, 2019.
– Wang J. (with S. Loughney), "Automation can make marine engineering systems safer", World Transport Convention 2019 (Smart Shipping and Maritime Safety), Beijing, China, 13-16 June, 2019.
– Wang J., "An evidential reasoning approach for safety and reliability management of large engineering systems under uncertainties", The Third International Symposium on Stochastic Models in Reliability Engineering, Life Sciences and Operations Management (SMRLO'19), May 28-31, 2019, Beijing, China.
– Wang J., "Risk-based Verification (RBV) of Large Engineering Systems such as Offshore Oil and Gas Installations", the Annual Conference of the Institute for Quality and Reliability (IQR) (www.ie.tsinghua.edu.cn/iqr), June 8-9, 2019, Shenzhen, P.R. China.
– Wang J., Loughney S., "Automation can make marine engineering systems safer, 2019 World Transport Convention (WTC2019), June 13-16, 2019, National Convention Center, Beijing.
– Wang J., "Risk-based decision making in design and operation of large engineering systems under uncertainties", Opening keynote address at 11th International Conference on Information Management and Engineering (ICIME 2019) & 2019 2nd International Conference on Information Hiding and Image Processing (IHIP 2019), British Computer Society, 19-21 September 2019.
– Yang Z., "Marine Pilot's Reliability Index (MPRI): Evaluation of marine pilot reliability in uncertain environments", plenary address in 3rd International Conference on Transport Information and Safety, July 14-18, 2019, Liverpool, UK.

b. Other invited presentations
– Bashir M., "Methodology for the structural health monitoring of floating offshore wind farm", 4th International Conference on Offshore Renewable Energy (CORE 2019), 29-30th August 2019
– Blanco-Davis E., "Presenting process flowsheet development, condition monitoring", Invited lecturer to University of South-Eastern Norway (USN), Vestfold, Norway, 8-9 July 2019.
– Loughney S., "How automation can make offshore installations safer", 5th International Conference on Transportation Information and Safety (ICTIS 2019), 16 July 2019.
– Malkeson S., Turquand d'Auzay C., Ahmed U., Pillai A.L., Chakraborty N., Kurose R., "Statistical analysis of displacement speed in an open turbulent jet spray flame", 14th International Conference on Energy for a Clean Environment, Funchal, Madeira, Portugal, 8-12 September 2019.
– Malkeson S., "Computational Fluid Dynamics (CFD) Analysis - Industrial and Academic Applications", IMechE (North West) Seminar, University of Central Lancashire, 17 October 2019.
– Nguyen T.T., "Anticipating and mitigating reactionary delays", in Enabling Better Network Performance exhibition event – organised by the RSSB and DfT, 4 April 2019.
– Nguyen T.T., "Data analytics for slippery rail", in Forecasting Adhesion Research Competition cross-project event – organised by the RSSB, September 2019.
– Nguyen T.T., "Operational Research in LJMU" and "Introduction to the LOOM institute", in the research talks to Information Technology Institute, Vietnam National University, December 2019.
– Paraskevadakis D., Sivori Hazel., "Integration of Inland Waterways in Logistics Gateways", EU project Smart Track for Waterways (ST4W) Workshop, Liverpool, UK, 20 Feb 2019.
– Ren J., "Modern Decision making methods in REMESH (I)" & "Modern Decision making methods in REMESH (II)", in the research seminar of Mahidol University, Bangkok, Thailand, 12 June 2019 &31 October 2019.
– Ren J., "Research on System dynamics modelling in SC management", Invited presentation in the research seminar of Southwest China Petroleum University, Chengdu, China, 25 June 2019.
– Shekwoyemi G., Paraskevadakis D., "Benchmarking the current state of the art of inland waterways through digitalisation and standardisation", Port of London Authority, 27 Sep 2019.

c. Participation in journal editorial boards
– 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 (2013-date). (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)
– Associate Editor of Marine Engineering and Technology. (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 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)
– Editor of Springer's Lecture Notes in Computer Science book Vol. 11454. (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)

- Associate Editor of Asian Journal of Shipping and Logistics. (ZY)

d. Participation in national or international advisory, review, funding, standards or planning bodies
- Reviewer for the International Association of Maritime Universities' (IAMU) research grants programme, 2019. (EBD)
- 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 & the Netherlands Organisation for Scientific Research (NWO). (UK). (LL)
- Editorial Advisor, Cambridge Publishing Group. (TTN)
- External expert, National Science Centre Poland. (TTN)
- External reviewer, Austrian Science Fund. (TTN)
- External reviewer, Christian Doppler Research Association, Austria government (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. (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)
- Committee member of the Merseyside West Cheshire IET. (RD)
- President of Psychophysiology in Ergonomics (an international working group of the International Ergonomics Association). (SF)
- 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 the University of Liverpool. (CM)
- 1 PhD examination at Norwegian University of Science and Technology, Norway. (JW)
- 1 PhD examination at Liverpool University. (ZY)
- 1 MPhil examination at Edinburgh Napier University. (ZY)

g. Involvement of conference organisation
- Co-Chair of Applications in Human Interaction and Design; Board of Industrial Cognitive Ergonomics and Engineering Psychology at 'International Conference on Applied Human Factors and Ergonomics (AHFE), 24-28 July 2019 Washington D.C. USA. (FBG)
- Organising Chairman of the 5th International Conference on Transportation Information and Safety (ICTIS 2019), Liverpool, UK, July 14-17, 2019. (JW)
- International Organising Committee for the International Conference on Information Technologies. September 2019. Varna, Bulgaria. (KOJ)
- International Organising Committee for the International Conference on Computer Systems and Technology (CompSysTech), September 2019. Ruse, Bulgaria. (KOJ)
- Co-Chair of Ocean Renewable Energy session for 38th International Conference on Ocean, Offshore and Arctic Engineering, 9-14 June 2019, Glasgow, UK. (MA)
- Co-Chairman, YoungShip Liverpool. (SL)
- Area chairman of the General Area, 22nd International Conference on the Applications of Evolutionary Computation, 2019. (TTN)
- Co-Chairman of the Organising Committee of 3rd International Conference on Transport Information and Safety, July 14-18, Liverpool, UK. (ZY)

h. Prizes/honours
- Best paper award, International Conference on Transportation Information and Safety ICTIS 2019, Liverpool, 2019. (A. Makki, JR, TTN)

i. Consultancy
- Advisor to ARUP Consulting for the Resilience Shift project https://www.resilienceshift.org/. (DP)
- Hi-Tech Steel Services, King and Fowler. (RD)
- AO.com. (SF)
- Merseyrail, Merseytravel, Peloton, Vauxhall. (TTN)
- UK DfT, AECOM, Transport Systems Catapult, TfGM, Mersey Travel, TfN. (ZY)

j. Others
- Chair of Automated and Digital Maritime workshop, event promoted by CILT and LJMU, LJMU, 18 Jul 2019. (CHC)
- Working in partnership with Risktec Solutions delivering distance learning and face-to-face modules. (DBM)

- MSc thesis by Daniel Adam runner up in Maritime UK Maritime Masters competition. (DBM *et al.*)
- Panel member of the "Mersey Cluster – Round Table Debate" held by the Ship Management International at Brookes Bell, Liverpool, 3 Oct 2019. (DP)
- LJMU's representative as a member of UK VLN (Vertical Lift Network). (LL)
- Participating University Maritime Masters programme (Maritime UK). (RP)
- Member of Women in Maritime Charter Mersey region discussion group (Mersey Maritime/Maritime UK). (RP)
- Host institution for the Institute of Chartered Shipbrokers Global Open Day, January 2019. (RP)
- MSc thesis by Kumran Kathiresan runner up in Maritime UK Maritime Masters competition. (SL *et al.*)
- Development of a collaborative PhD programme in maritime and logistics management with Ningbo University China. (ZY *et al.*)

Appendix 1: Publications published in 2019

Book

1. Kaffman P., …, Nguyen TT, *et al.* (Eds.), Applications of Evolutionary Computation, 22nd European Conference, EvoApplications 2019, LNCS vol. 11454, Springer, 2019.

Edited work

2. Zhang D., Wang J., Special Issue: Emerging Technologies for Maritime Risk Assessment: Opportunities, Challenges and Initiatives, Proceedings of the Institution of Mechanical Engineers, Part O: Journal of Risk and Reliability, Vol.233, No.1, February 2019, 1-85 (ISSN: 1748006X).

Published industrial reports

3. Loughney S., Wang J., Wall A., Ship/Platform collision incident database (2015), The Health and Safety Executive (HSE). HSE Book RR1154, 2019, 175 pages, https://www.hse.gov.uk/research/rrhtm/rr1154.htm.

4. 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, 2019, 100 pages, RR1153, https://www.hse.gov.uk/research/rrhtm/rr1153.htm

Book chapter

5. 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", In Maritime Transport and Regional Sustainability, 2019, Eds by Ng A. Monios J. and Jiang C., Elsevier.

Refereed academic journal papers (SCI cited)*

6. Alyami H., Yang Z., Riahi R., Bonsall S., Wang J., "Accident Advanced uncertainty modelling for container port risk analysis", Accident analysis and Prevention, 2019, Vo.123, 411-421. (IF = 3.058)

7. Asuquo M.P., Wang J., Phylip-Jones G., Riahi R., "Condition monitoring of marine and offshore machinery using evidential reasoning techniques", Journal of Marine Engineering & Technology, 2019, https://doi.org/10.1080/20464177.2019.1573457. (IF = 0.548)

8. Asuquo M.P., Wang J., Zhang L., Phylip-Jones G., "Application of a multiple attribute group decision making (MAGDM) model for selecting appropriate maintenance strategy for marine and offshore machinery operations", Ocean Engineering, 2019, Vol.179, 246-260 (doi.org/10.1016/j.oceaneng.2019.02.065). (IF = 2.73)

9. Barrlett Z., Han L., Nguyen T.T., Johnson P., "Novel online dynamic temporal context neural network framework for the prediction of road traffic flow", IEEE Access, 2019, Vol.7, 153533 - 153541. (IF: 4.098).

10. Chang C.H., Xu, J., Dong, J., Yang, Z., "Selection of effective risk mitigation strategies in container shipping operations", Maritime Business Review, 2019, Vol. 4 No.4, 413-431. (IF = na)

11. Chen C., Chen X.Q., Ma F., Zeng X.J., Wang J., "A knowledge-free path planning approach for smart ships based on reinforcement learning", Ocean Engineering, 2019, Vol.189, doi.org/10.1016/j.oceaneng.2019.106299. (IF = 2.73)

12. Chen C., Chen X.Q., Ma F., Chen Y.W., Wang J., "Deviation warnings of ferries based on artificial potential field and historical data", Proc IMechE Part M: Journal of Engineering for the Maritime Environment, 2019, 1–16, doi: 10.1177/1475090219892736. (IF = 1.241)

13. Chen J.H., Bian W.T., Wan Z., Yang Z., Zheng H.Y., Wang P.P., "Identifying factors influencing total-loss marine accidents in the world: Analysis and evaluation based on ship types and sea regions", Ocean Engineering, 2019, Vol. 161, 106495. (IF = 2.73)

14. Deplano I., Lersteau C., Nguyen T.T., "A mixed-integer linear model for the Multiple Heterogeneous Knapsack Problem with realistic container loading constraints and bins' priority", International Transactions in Operational Research, 2019, https://doi.org/10.1111/itor.12740. (IF = 2.4)

15. Deplano I., Yazdani D., Nguyen T.. "The Offline Group Seat Reservation Knapsack Problem with Profit on Seats", IEEE Access, 2019, Vol.7, 52358 - 152367. (IF = 4.098)

16. Ha M., Yang Z., Lam J.S.L., "Port performance in container transport logistics: A multi-stakeholder perspective", Transport Policy, 2019, Vol.73, 25-40. (IF = 3.190)

17. Kartal S.E., Ugurlu O., Kaptan M., Arslanoğlu Y., Loughney S., Wang J., "An analysis and comparison of multinational officers of the watch in the global maritime labor market", Maritime Policy & Management, 2019 Vol.46(6), 2019, 575-780. (IF = 1.741)

18. Liu J., Li H., Yang Z., Wu K., Liu R.W., "Adaptive Douglas-Peucker algorithm with automatic thresholding for AIS-Based vessel trajectory compression", IEEE Access, 2019, Vol.7, 150677-150692. (IF = 4.098)

19. Loughney S., Wang J., Matellini D.B., " Utilising Bayesian networks to demonstrate the potential consequences of a fuel gas release from an offshore gas-driven turbine", Proc IMechE Part M: Journal of Engineering for the Maritime Environment, 2019, Vol.233, Issue 4, 1177-1197. (IF = 1.241)

20. Malkeson S., Wacks D.H., Chakraborty N., "Statistical behaviour and modelling of fuel mass fraction dissipation rate transport in turbulent flame droplet interaction: A Direct Numerical Simulation study", Flow, Turbulence and Combustion, https://doi.org/10.1007/s10494-019-00083-3, 2019. (IF = 2.371)

21. Qi H., Mayhew C., Zhai Y., Wang S., Yu D., Gomm J.B., Zhang Q., "Fault tolerant control of electronic throttles with friction changes" Electronics, 2019, vol 8(9), 918. (IF: 1.764)

22. Qi H., Shi Y., Tian Y., Mayhew C., Yu D., Gomm J.B., Zhang Q., "A new fault diagnosis and fault-tolerant control method for mechanical and aeronautical systems with neural estimators" Advances in Mechanical Engineering, 2019, online published at https://doi.org/10.1177/1687814019891659. (IF: 1.024)

23. Sabe M., Kontovas C.A, Lindwood (2019) "A risk assessment framework to reduce the risk of collisions between ships and whales", Marine Policy, 2019, Vol.109, doi:10.1016/j.marpol.2019.103697. (IF = 2.85)

24. Troelsen P., Wilkinson D., Seddighi M., Allanson D., Falkingham P., "Functional Morphology and Hydrodynamics of Plesiosaur Necks: Does Size Matter?", Journal of Vertebrate Paleontology, 2019, Vol.39(1). (IF = 1.738)

25. Wan C., Yan X.P., Zhang D., Yang Z., "A novel policy making aid model for the development of LNG fuelled ships", Transportation Research Part A: Policy and Practice, 2019, Vol.119, 29-44. (IF = 3.693)

26. Wan C., Yan X.P., Zhang D., Yang Z., "Analysis of risk factors influencing the safety of maritime container supply chains", International Journal of Shipping and Transport Logistics, 2019, Vol.11(6), 476-507. (IF = 1.277)

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* IF: Impact Factor.

27. Wan C.P., Yan X.P., Zhang D., Qu Z., Yang Z., "An advanced fuzzy Bayesian-based FMEA approach for assessing maritime supply chain risks", Transportation Research Part E: Logistics and Transportation Review, 2019, Vol. 125, 222-240. (IF = 4.253)
28. Wang R., Nguyen T.T., Li C. Jenkinson I., Yang Z., Kavakeb S., "Optimising discrete dynamic berth allocations in seaports using a Levy Flight based meta-heuristic", Swarm and Evolutionary Computation, 2019, Vol.44, 1003-1017. (IF = 6.330)
29. Wang T., Qu Z, Nichol T., Yang Z., Dimitriu D., Clarke G., Bowden D., "How can the UK road system be adapted to the impacts posed by climate change? By creating a climate adaptation framework", Transportation Research Part D: Transport Environment, 2019, Vol.77, 403-424. (IF = 4.051)
30. Wang Y.F., Liu Z.M., Jiang J., Khan F., Wang J., "Blowout fire probability prediction of offshore drilling platform based on system dynamics", Journal of Loss Prevention in the Process Industries, Vol.62, 2019, 1-8, doi: 10.1016/j.jlp.2019.103960. (IF = 2.069)
31. 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, 2019, Vol.197. doi: 10.1016/j.oceaneng.2019.106869. (IF = 2.73)
32. Yang Z., Mehmed E., "Artificial neural networks in freight rate forecasting", Maritime Economics and Logistics, 2019, Vol.21, 390-414. (IF = 1.661)
33. Yang Z., Abujaafar K.M., Qu Z., Wang J. and Nazir S., "Use of evidential reasoning for eliciting Bayesian subjective probabilities in human reliability analysis: a maritime case", Ocean Engineering, 2019, Vol.186, 106095. (IF = 2.73)
34. Yang Z.Z., Guo L., Yang Z., "Emergency logistics for wildfire suppression based on forecasted disaster evolution", Annals of Operations Research, 2019, Vol.283, 917-937. (IF = 1.864)
35. Yang Y., Li C., Bashir M., Wang J., Yang C., "Investigation on the sensitivity of flexible foundation models of an offshore wind turbine under earthquake loadings", Engineering Structures, 2019, Vol.183, 756–769. (IF = 3.084)
36. Yang Y., Bashir M., Li C., Wang J., "Analysis of seismic behaviour of an offshore wind turbine with a flexible foundation", Ocean Engineering, 2019, Vol.178, 215-228. (IF = 2.73)
37. Yang Z., Abujaafar K. F., Qu Z., Wang J., Nazir S., "Use of evidential reasoning for eliciting Bayesian subjective probabilities in human reliability analysis: A maritime case", Ocean Engineering, 2019, Vol.186, doi.org/10.1016/j.oceaneng.2019.05.077. (IF = 2.73)
38. 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, 2019, https://doi.org/10.1109/TEVC.2019.2902626. (IF: 8.05)
39. Yazdani D., Nguyen T.T., Branke J., "Robust optimization over time by learning problem space characteristics", IEEE Transactions on Evolutionary Computation, 2019, Vol.23, 143-155. (IF: 8.05)
40. Yazdani D., Omidvar M.N., Deplano I., Lersteau C., Makki A., Wang J., Nguyen T.T., "Real-time seat allocation for minimizing boarding/alighting time and improving quality of service and safety for passengers", Transportation Research Part C: Emerging Technologies, 2019, Vol.18, 158-173. (IF = 5.775)
41. Zhan X., Shen C., Ji Z., Chen J., Fang H., Guo F., Zhang J., "A Dual-Point technique for the entire ID-VG characterization into subthreshold region under Random Telegraph Noise condition", IEEE Electron Device Letters, 2019, Vol.40(5), 674-677. (IF= 3.753)

Refereed conference papers

42. Agarwal D., Lu L., Padfield G.D., Cameron N., White M.D., Gubbels A.W, "Rotorcraft simulation fidelity for low speed manoeuvring using 'additive' system identification", 45th European Rotorcraft Forum, Warsaw, Poland, 17-20 September 2019.
43. Atiyah A, Kontovas C.A., Saeed F., Yang Z., "Marine Pilot's Reliability Index (MPRI): Evaluation of marine pilot reliability in uncertain environments", 5th International Conference on Transportation Information and Safety (ICTIS 2019), 14-17 July 2019, Liverpool, UK, doi:10.1109/ICTIS.2019.8883712.
44. Cameron N., White M.D., Padfield G.D., Lu L., Agarwal D., Gubbels A.W, "Rotorcraft Modelling Renovation for Improved Fidelity", The Vertical Flight Society's 75th Annual Forum & Technology Display, Philadelphia, PA, USA, 13-16 May 2019.
45. Chang C.H., Kontovas C., Yang Z., "Hazard identification of maritime autonomous surface ships", Logistics Research Network (LRN) 2019, 04 - 06 Sep 2019, Northampton, UK.
46. Chang C.H., Zhang X., Guo, X., Qu, Z., "Environmental impact of autonomous ships operations", IAME 2019, 24-28 June 2019, Athens, Greece.
47. Chang C.H., Shi W., Zhang W., Park C., Kontovas C., "Evaluating cybersecurity risks in the maritime industry: a literature review", Proceedings of the International Association of Maritime Universities (IAMU) Conference, Tokyo, Japan, Nov. 2019, ISSN: 2706-6762.
48. Guo F.B., Du H., Wang Y., Chen Y., Ge X., "A comparative research of culture-led regeneration across cities in China", ICUSP 2019: International Conference on Urban Studies and Planning, August 2019, London.
49. Guo F., Yang Z., Jenkinson I., Ender J., "Changing the role of design", 10th International Conference on Applied Human Factors and Ergonomics, 24 - 28 Sept. 2019, Washington, USA.
50. Hassan S., Wang J., Moh'd A., "Cross country pipeline risk-based failure prediction using hybrid fuzzy rule and Grey Theory in FMEA – A Nigeria's pipeline system case study", Proceeding of the 15th Pipeline Technology Conference - Europe's Leading Pipeline Conference and Exhibition, 30 Mar. - 2 Apr. 2019, Estrel, Berlin, Germany.
51. Hassan S., Wang J., Bashir M., Kontovas C., "Application of Bayesian Model for third party damage assessment of cross-country oil pipeline under uncertainty", Proceedings of the 29th European Safety and Reliability Conference Hannover, Germany, 22-26 Sept. 2019, Edited by Michael Beer and Enrico Zio, Research Publishing, Singapore, 1486-143, doi:10.3850/978-981-11-2724-3.
52. Kontovas C.A., "The market and economics of mobile port-based ballast water treatment solutions", Proceedings of IAME 2019, 25-28 June 2019, Athens, Greece.
53. Loughney S., Wang J., Matellini D.B., "Applying a Bayesian Network methodology to an offshore gas turbine driven power generator to demonstrate the cause and effect relationship of the turbine running over-speed and the associated switchboard failures", Proceedings of the 29th European Safety and Reliability Conference (ESREL), 22-26 Sept. 2019, Hannover, Germany, 3606-3614.
54. Loughney L., Wang J., Matellini D.B., "Applying a Bayesian Network Methodology to an Offshore gas Turbine Driven Power Generator to Demonstrate the Cause and Effect Relationship of the Turbine Running Over-speed and the Associated Switchboard Failures", Proceedings of the 29th European Safety and Reliability Conference Hannover, Germany, 22-26

Sept. 2019, Edited by Michael Beer and Enrico Zio, Research Publishing, Singapore, 3606-3613, doi: 10.3850/978-981-11-2724-3.

55. Madubuike K., Mayhew C., Zhang Q., Gomm B., Yu D., "Fault diagnosis for wind turbine systems using unknown input observer", Proceedings of 25th International Conference on Automation and Computing (ICAC), 5-7 September 2019, Lancaster, United Kingdom

56. Madubuike K., Mayhew C., Zhang Q., Gomm B., Yu D., "Fault diagnosis for wind turbine systems using a neural network estimator", Proceedings of 25th International Conference on Automation and Computing (ICAC), 5-7 September 2019, Lancaster, United Kingdom.

57. Ji K., Zhang Q., Cheng H., Yu D., "A virtual force interaction scheme for monitoring complex unknown environments by autonomous mobile robots", Proceedings of 18th European Control Conference (ECC), 25-28 June 2019, Naples, Italy, 95-100.

58. Makki A.A., Nguyen T.T., Ren J., "A new level of service method for roads based on available perception time and risk of sustaining severe injury or death", ICTIS 2019 - 5th International Conference on Transportation Information and Safety, 14-17 July 2019, Liverpool, UK, 1031-1036.

59. Nguyen Q., Johnson P., Nguyen T.T., Randles M., "A novel architecture using iBeacons for localization and tracking of people within healthcare environment", Global IoT Summit 2019.

60. Nguyen Q.H., Johnson P., Nguyen T.T., Randles M., "A novel architecture using iBeacons for localization and tracking of people within healthcare environment", Global IoT Summit 2019.

61. Park C., Shi W., Zhang W., Chang C.H., "Evaluating cybersecurity risks in the maritime industry: a literature review", IAMUC 2019, 1 November, Tokyo, Japan.

62. Tusher H.M., Mallam S.C., Praetorious M., Yang Z., Nazir S., "Operator training for the non-technical skills in process industry", European Symposium on Computer Aided Process Engineering, 16-19 June2019, Eindhoven, The Netherlands.

63. Ugedi P., Chang C.-H., Kontovas C.A., "Performance assessment of the SOLAS VGM regulation using balance scorecard and analytic hierarchy process", Proceedings of IAME 2019, June 25-28 2019, Athens, Greece.

64. Usman M., Yang Z., "Combining fuzzy modelling and Bayesian Network (BN) approach to assess two-stroke engine performance", 9th CIMAC World Congress on Internal Combustion Engines, 10–14 June 2019, Vancouver, Canada.

65. Wan C.P., Yang Z., Yan X.P., Zhang D., David-Blanco E., Ren J., "Risk-based resilience analysis of maritime container transport networks", European Safety and Reliability Conference (ESREL 2019), 23-26 September 2019, Hannover, Germany.

66. White M.D., Padfield G.D., Cameron N., Lu L., Agarwal D., "The need for increased fidelity in flight training devices to address the 'rotorcraft loss of control inflight' problem", The Vertical Flight Society's 75th Annual Forum & Technology Display, 13-16 May 2019, Philadelphia, PA, USA.

67. Xi Y.T., Hu S.P., Yang Z., Fu S., Qin T.R., "The regulatory effect of risk tolerance on the hazardous attitudes and safety behavior of maritime pilots: a Chinese case", 3rd International Conference on Transport Information and Safety, 14-18 July 2019, Liverpool, UK.

68. Yang Z.S., Yang Z., Yin J.B. and Qu Z. (2019), "Use of Bayesian Network to analyse risk-based game model of Port State Control", International Association of Maritime Economics Annual Conference, 25-28 June, Athens, Greece.

Other publications

69. Ender J., Wagner J. C., Kunert G., Guo F. B., Larek R., Pawletta T., "Concept of a self-learning workplace cell for worker assistance while collaboration with a robot within the self-adapting-production-planning-system", Informatyka, Automatyka, Pomiary W Gospodarce I Ochronie Środowiska, 2019, Vol.9(4), 4-9.

70. Poo M.P.C., Yang Z., "Vehicle cleanliness priority: Key green performance indicators" (poster presentation), Eco-I 2019 Conference on Innovation for Clean and Sustainable Growth, 19-20 September 2019, Lancaster, UK.

71. Pyne R.M. "EU customs checks are an 'opportunity' for the Port of Liverpool" Liverpool Business News, December 2019, excerpt also published in Business Live https://www.business-live.co.uk/ports-logistics/post-brexit-customs-checks-liverpool-17399938, December 2019.

72. Symes S., Yang Z., Blanco-Davis E., Wang J. and Fairclough S., "Fault detection and correction in the engine room of a ship: An fNIRS study" (oral presentation), Annual Meeting of the Human Factors and Ergonomics Society Annual Meeting (European Chapter), 2-4 October 2019, Nantes, France.

73. Zhang D., Wang J., "Editorial on Proceedings of the Institution of Mechanical Engineers Part O – Journal of Risk and Reliability", Journal of Risk and Reliability, Vol.233, Issue 1, 2019, 3-4.

74. Zhao Y., Du H., Guo F.B., "Consideration of human factors in a design of fire-rescue window", The 'Art Work', 2019, Vol.19(1).

Appendix 2: LOOM monthly seminars in 2019

Time: 10.00-11.15, first Wednesday of each month from February 2019.
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 2019, LOOM has delivered 12 research seminars with 4 external researchers providing invited presentations.

Frist and Second Quarters – **Dr. E. Blanco** / Dr. Chia-Hsun Chang / Dr. J. Ren / Dr. Q. Zhang

4th March, 2pm to 3pm, Room 308, James Parsons Building.

Dr. Dong Yang (external speakers), Assistant Professor, Department of Logistics and Maritime Studies, Director of International Shipping and Transport Logistics Master Program, Deputy Director of Shipping Research Centre, Hong Kong Polytechnic University

Title:	"One Belt one Road, but several routes: studies of new emerging trade corridors connecting the Far East to Europe"
Abstract:	"With the launch of the Belt and Road (B&R) initiative in 2015, some new emerging trade corridors connecting the Far East to Europe have been developed. In order to understand the implementation effect of the B&R and the development of these corridors, a series of studies have been conducted by us. In this talk, I would like to share three of our research topics in this regard. In the first study, since it is expected that the effective import tariff rate may continue to decrease in the future because more Free Trade Agreements will be concluded and more Free Trade Zones will be established under the B&R initiative, we analyse the impact of further reduction in Chinese import tariff rate on major economic indicators using a computable general equilibrium (CGE) model, based on the Chinese macro-economic data of 2012. Second, we notice that the government's development priorities on the new emerging corridors may be at variance with the preferences of industry practitioners, therefore, we examine the attitudes of them towards the performance of the new emerging trade corridors with Fuzzy Multi-Criteria Decision Analysis (MCDA), and apply concepts of institutional theories to understand the reasons behind the variance and how it affects the development of new corridors. Third, we aim to figure out the optimal shipping service network of carrier as response towards the new emerging corridors."

6th March

Shulah Jones	"Reciprocity and Mutuality: A Study into the Emergence of a New Maritime Economy in the Liverpool City Region."
Huanhuan Li	"Clustering of shipping routing for risk analysis"

3rd April

Cameron Kelly	"Investigation into the uses of Life Cycle Analysis (LCA) as an Alternative Method of Selecting Tidal Power Schemes"
Charly Lersteau	"Mitigating the impact of reactionary delays in rail"

3rd April, 1pm to 2pm, Room 310, James Parsons Building.
Professor Harilaos N. Psaraftis (external speaker), Department of Management Engineering, Technical University of Denmark.

Presentation title:	"Decarbonization of maritime transport: to be or not to be?"
Abstract:	"International shipping is currently at a crossroads. The decision of the 72nd session of the Marine Environment Protection Committee (MEPC 72) of the International Maritime Organization (IMO) in April 2018 to adopt an Initial Strategy for the reduction of maritime greenhouse gas (GHG) emissions epitomizes the last among a series of recent developments as regards sustainable shipping. It also sets the scene on what may happen in the future. Among other things, the IMO has decided to reduce GHG emissions from shipping by at least 50% in 2050 as compared to 2008 levels. This talk takes a critical look at this and other recent developments and focuses on the challenges faced by the industry if a path to significant GHG reductions is to be successful."

1st May

Sean Loughney	"Determining the most suitable location on the UKCS for the implementation of a floating offshore wind farm through the application of a multiple-attribute decision-analysis methodology"

5th June

Dr. Trakarn Prapaspongsa (external speakers), Assistant Professor, Faculty of Engineering, Mahidol University, Thailand

Presentation title:	"Eco-Efficient Engineering Research and Applications towards Green Industry and Communities"
Abstract:	"Research and education have played a great role in sustainable development around the world. In the presentation, case studies being experimented by Mahidol EcoLab throughout 7-year works at Mahidol University in Thailand are presented. The main aim of Mahidol EcoLab is to facilitate an understanding on preventive environmental measures for improvements while maintaining socio-economic benefits. The focuses are on research, development and applications of the key eco-efficient methods and tools (ECO-TOOLS) applied worldwide towards sustainability. The tools include life cycle thinking (LCT), life cycle assessment (LCA), life cycle management (LCM), carbon footprint (CF), water footprint (WF), eco-efficiency assessment, sustainability assessment, eco-design, eco-labelling, industrial ecology, and clean technology. In order to carry out the eco-efficient engineering

research and applications effectively, various measures using stakeholders and partnerships as the centre to solve the problem as well as to support green industry and communities have been applied as demonstrated in the below figure. Recent case studies on various industries including maritime industry will be presented. All in all, the provision of professional research works could support green industry and communities in Thailand as well as other countries."

Preye Ugedi   "Assessing the effectiveness and implementation of the SOLAS Verified Gross Mass (VGM) Regulation"

Third Quarter – Chairing person: **Dr. Dimitrios Paraskevadakis** / Dr. T.T. Nguyen / Dr. Musa Bashir

3rd July
G. Asuelimen   "Risk Analysis of an Arctic Marine Seismic Survey Operation (AMSSO)"
Ahmed Makki   "Effect of Container Carrier Heavy Goods Vehicles on Traffic Flow Congestion"

7th August
Oraith Hassan   "The impact of human element factors on pilotage operations safety"
Stephen Symes   "Ship simulator-based seafarers' skill acquisition incorporating the use of Functional-Infrared Spectroscopy (fNIRS)"

4th September
Edward Shaw   "A lifecycle based approach towards implementing functional safety in the UK marine sector"
Yang Yang   "Fatigue Analysis of a 10 MW Spar Floating Offshore Wind Turbine Tendons by Considering the Wind-Wave Coupling Effect"

Fourth Quarter – Chairing person: **Dr. D.B. Martellini** / Dr. Milad Armin / Dr. C. Kontovas

2nd October
Dr. Yan Fu Wang (external speakers), Associate Professor, China University of Petroleum
Presentation title: "Emergency Decision Support System for Offshore Safety"
Abstract: "Fire accidents on offshore oil and gas platform are analysed to identify the typical fire scenarios, followed by numerical simulation on the temporal and spatial evolution of the fires. Secondly, the coupling mechanism between human behaviour and fire development will be investigated to quantitatively characterize the impact of fire on people and other assets. Thereafter, based on fire numerical simulation and multi-agent theory, an evacuation simulation model of offshore platform fires will be proposed. Finally, a dynamic decision-making support system for fire emergency evacuation will be designed."

Kang Ji   "Swarm intelligence-based decision-making for many-agent autonomous systems"

6th November
Dr. Ian Jarman, Head of Data Science Research Centre, Department of Applied Mathematics, LJMU
Presentation title: "An introduction to the work of the Data Science Research Centre"
Abstract: "Do you have lots of data? Don't know what to do with it? Or perhaps you think you are not making the most of it? This talk introduces you to the work of the Data Science Research Centre based within the Applied Mathematics Department, Dr Ian Jarman will present some case studies of their work to give you a flavour of the range of expertise available. Their work covers a lot of disciplines from Public Health, medicine, psychology, crime, all the way to football, retail and even music. Of course, the common theme for all the work being data analysis. The aim of the talk is to hopefully spark inspiration for new and exciting uses for your data or even the beginning of multi-disciplinary collaborations."

4th December
Yannis Ancele   "Routing algorithms for optimisation of transportation systems"
Igor Deplano   "The building blocks of a recommendation system that forecasts reactionary delays and suggests mitigation strategies"