



UNIVERSITY
of DERBY

ICMR2022 Conference Guide



19th International Conference in Manufacturing Research
6 – 8 of September 2022

University of Derby
Kedleston Road, Derby, DE22 1GB, UK
Conference Website: www.icmr.org.uk



University of Derby Main Headquarter - Website: <https://www.derby.ac.uk/>

19th International Conference in Manufacturing Research

Incorporating the 36th National Conference in
Manufacturing Research

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International Conference in Manufacturing Research (ICMR)

The International Conference in Manufacturing Research (ICMR) is a major event for academics and industrialists who are engaged in manufacturing research. Held annually in the UK (except 2018 in Sweden) since the late 1970s, the conference is renowned as a friendly and inclusive platform that brings together a broad community of researchers who share a common goal: developing and managing technologies and operations that are key to sustaining the success of manufacturing businesses. For over two decades, ICMR has been the main manufacturing research conference organized in the UK, successfully bringing researchers, academics, and industrialists together to share their knowledge and experiences. Initiated as a National Conference by the Consortium of UK University Manufacturing and Engineering (COMEH), it became an International Conference in 2003.

COMEH is an independent body established in 1978. Its main aim is to promote manufacturing engineering education, training, and research. The Consortium maintains a close liaison with government bodies concerned with the training and continuing development of professional engineers, while responding to the appropriate consultative and discussion of documents and other initiatives. COMEH is represented on the Engineering Professor's council (EPC) and it organizes and supports manufacturing engineering education research conferences and symposia. Hosts for National Conferences on Manufacturing Research (NCRM) have been:

1985	Nottingham	1994	Loughborough
1986	Napier	1995	Leicester De Montfort
1987	Nottingham	1996	Bath
1988	Sheffield	1997	Glasgow Caledonian
1989	Huddersfield	1998	Derby
1990	-	1999	Bath
1991	Hatfield	2000	East London
1992	Central England	2001	Cardiff
1993	Bath	2002	Leeds Metropolitan

In 2003 the conference title became the International Conference in Manufacturing Research (ICMR) incorporating the NCRM. The host universities for ICMR have been:

2003	Strathclyde	2013	Cranfield
2004	Sheffield Hallam	2014	Southampton Solent
2005	Cranfield	2015	Bath
2006	Liverpool John Moores	2016	Loughborough
2007	Leicester De Montfort	2017	Greenwich
2008	Brunel	2018	Skövde, Sweden
2009	Warwick	2019	Queen's University Belfast
2010	Durham	2021	Derby
2011	Glasgow Caledonian	2022	Derby
2012	Aston		

Preface

On behalf of the ICMR2022 organising committee, first and foremost we would like to Thank COMEH for inviting University of Derby to host ICMR2022. We would like to take this opportunity to thank all the contributing authors for their high-quality papers submitted, the reviewers for their time and constructive comments, the keynote speakers for sharing their research with the delegates and the local organizing committee for their meticulous preparation of the conference. Our thanks go to the Programme Committee members who helped to review papers and ensure the high quality of the conference.

We would like to acknowledge the Institute of Innovation for Sustainable Engineering (IISE), Institute of Technology, and Research, Innovation and Enterprise Centre at the University of Derby, Derby, UK & Rolls Royce – Derby, UK & FESTO and Siemens, Ireland and UK & Microsoft, UK & Manufacturing Technology Centre (MTC), Coventry - UK and Institute of Mechanical Engineering (IMechE), UK for their support to this conference.

The theme of ICMR2022 conference is smart manufacturing. Within the context of Industrial 4.0 and beyond, ICMR2022 will bring researchers, academics, and industrialists together to share their vision, knowledge, know-how and experience, and discuss emerging trends and new challenges in the field. The conference includes 12 keynote speeches presented by Mr. Ian Scotts, Rolls Royce, Derby, UK, Professor Agus Budiyo, Indonesia, Dr Lina Huertas, Microsoft, UK, Dr Toby Maw, MTC, UK, Professor Yi Qin, University of Strathclyde, Professor Yan Jin, Queen's University Belfast, UK, Professor Khamis Essa, Birmingham University, UK, Professor Mozafar Saadat, Birmingham University, UK, Mr. Babak Jahanbani, FESTO and Siemens, Ireland and UK, Professor Stephan Reiff-Marganiec, University of Derby, UK, Professor José Paulo Ferreira Lousado, Institute of Viseu, Portugal and Professor Mahmoud Shafik, University of Derby, UK. There are 58 papers accepted and presented in the proceedings, out of more than 78 papers submitted representing an acceptance rate of 72%.

We look forward to welcoming you all at Derby and wish that every delegate enjoys the conference.

Mahmoud Shafik & Keith Case

Editors

Organization and Committees

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Chris Bussell and Warren Manning, University of Derby, Derby, UK

Conference Chair

Mahmoud Shafik, University of Derby, Derby, UK

Conference Secretariat

Joanna Atkinson, University of Derby, Derby, UK

Carmen-Isabela Anichei, University of Derby, Derby, UK

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Dr Peter Thorvald, University of Skövde

Professor Mahmoud Shafik, University of Derby

Professor Yan Jin, Queen's University Belfast

Professor Weidong Li, Coventry University

Professor Konstantinos Salonitis, Cranfield University

Programme Committee

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Professor Fayyaz Rehman, Southampton Solent University
Professor Linda Newnes, University of Bath
Professor Keith Case, Loughborough University
Professor Peter Ball, University of York
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Dr Alan Crispin, Manchester Metropolitan University
Professor James Gao, University of Greenwich
Dr Yee Mey Goh, Loughborough University
Professor David Harrison, Glasgow Caledonian University
Professor Mehmet Karamanoglu, Middlesex University
Professor Riham Khalil, Homeodynamic Autonomy Limited
Professor Weidong Li, Coventry University
Professor Diane Mynors, University of Sussex
Dr Aydin Nassehi, University of Bristol
Professor Yi Qin, Strathclyde University
Professor Essam Shehab, Nazarbayev University
Professor Sameh Saad, Sheffield Hallam University
Dr Mozafar Saadat, University of Birmingham
Dr Peter Thorvald, University of Skövde
Professor Yan Jin, Queen's University Belfast

ICMR2022 Conference Programme

Monday 5th of September 2022	
ICMR 2022 Conference Registration ATRIUM University of Derby, Kedleston Road, Derby, DE22 1GB, UK 18:00 until 22:00 hours	
Tuesday 6th of September 2022	
09:30 – 10:00	Session 1: Conference Opening and Welcome Chari: Mahmoud Shafik Co-chairs: Sabuj Mallik & Stephen Reiff-Marganec Auditorium: OL_1 University of Derby, Kedleston Road, Derby, DE22 1GB, UK
	Kathryn Mitchell Vice Chancellor, University of Derby, UK Warren Manning Provost Innovation & Research and Enterprise, ICMR2022 Conference General Chair, University of Derby, UK Chris Bussell PVC and Dean of College of Science and Engineering, ICMR2022 Conference General Chair, University of Derby, UK
10:00 - 12:30	Session 2: Keynotes Session – Chair: Mahmoud Shafik Manufacturing from a Microsoft Perspective Lina Huertas, Microsoft, UK Advanced Manufacturing Empowered by Parallel Kinematic Machines Yan Jin, Queen’s University Belfast, UK Developing Smart Materials, Structures and Systems for Energy Harvesting through Advanced Manufacturing Yi Qin, University of Strathclyde, UK From Research to Industry: Development of Unmanned System Technologies in Indonesia Agus Budiyo, CAP Solutions, Indonesia
12:20	Photo of Conference Participants
12:30 – 13:30	Lunch Break – ATRIUM

13:30 – 15:00	Session 3-A Smart Manufacturing Chair: Stephan Reiff-Marganiec Co-chair: Sabuj Mallik Auditorium: OL_1	Session 3-B Digital Manufacturing Chair: Andrew Thomas Co-chair: Mahmoud Shafik Auditorium: OL_2	Session 3-C Additive Manufacturing Chair: Yi Qin Co-chair: Todor Dobrev Auditorium: HEAP
	Identifying and Predicting Cybersecurity threats in Industry 4.0 based on the motivations towards a critical infrastructure <i>Adel Alqudhaibi, Abdulmohsan Aloseel, Sandeep Jagtap, and Konstantinos Salonitis</i>	Innovation Framework for Digital Era <i>Sameh Saad and Samah Alnuaimi</i>	Introduction of Additive Manufacture Technology to the Design and Development of Gripper Arms used on Traverse Mechanism for Transportation of Carrier Pucks Containing Soft Contact Lenses on Automated Inspection System (AIS) Module <i>Radoslaw Wojcieszek, Jason Williams and Fayyaz Rehman</i>
	Industry 4.0: A Review of Digital Retrofitting Solutions for Legacy Manufacturing Systems <i>Alqoud, D. Schaefer, J. and Milisavljevic-Syed</i>	Sustainable Digital Transformation: The Role of Organisational Digital Culture <i>Yasser Omar Abdallah, Essam Shehab and Ahmed Al-Ashaab</i>	Generative Design and Topology Optimisation of Products for Additive Manufacturing <i>James Coulthard and Chang Jiang Wang</i>
	Industry 4.0: Challenges and Opportunities of Digitalisation Manufacturing Systems <i>A. Alqoud, Dirk Schaefer and Jelana Milisavljevic-Syed</i>	Maturity Model Development for Digital Servitization of Manufacturing SMEs <i>Md Khan, D. Schaefer and J. Milisavljevic-Syed</i>	Integration of Environmental Assessment in Process Engineering of Metal Additive Manufacturing Technology <i>Ons Mrabet, Raoudha Gaha, Julie Marteau, Borhen Louhichi and Benoit Eynard</i>
	A Smart Sensor Box to Increase the Adaptability of Automated Manufacturing <i>Andrew Loeliger, Erfu Yang and Iain Bomphray</i>	Computer Aided Design of Self-Learning Robotic System using Imitation Learning <i>Yagna JADEJA, Mahmoud SHAFIK and Paul WOOD</i>	Finish Machining of Additively Manufactured Inconel 718 – A review <i>Urvashi GUNPUTH, Jalal HAMA, Yiling LU, Paul WOOD, Hoda AMEL, Paul TRODDEN</i>
	Implementing Smart Manufacturing Technology into the Textile Industry <i>Daire O'Dubhthaigh, Marlies Borchers, Yan Jin and Paul Maropoulos</i>	Systematic Literature Review of Industry 4.0 Implementation Frameworks Focusing on Applicability in Manufacturing SMEs <i>Joshua Denning and Kapila Liyanage</i>	
15:00 – 15:30	Coffee Break – ATRIUM		

15:30 – 17:00	Session 4-A Robotics and Industrial Automation Chair: Agus Budiyo Co-chair: Hany Atlam Auditorium: OL_1	Session 4-B Composite Manufacturing and Machining Processes_1 Chair: Fayyaz Rahman Co-chair: Kapila Liyanage Auditorium: OL_2	Session 4-C Product Design, Development and Quality Management_1 Chair: Keith Case Co-chair: Stephen Pearson Auditorium: HEAP
	Modular, Mobile and Autonomous Robotics for Manufacturing SMEs <i>Lancelot Martin, James Gao, Chi Hieu Le, Ahmed Sarhan, Sotia Cherepeti and Antoine Sarrazin</i>	Literature Review of Fatigue Life Performance of Ceramic Materials <i>Georgios Karadimas and Konstantinos Salonitis</i>	Towards Predictive Design: Tracking a CNC Fixture Design Process to Identify the Requirements <i>Gokula Vasantha, David Purves, Jonathan Corney, Michael Canavan, John Quigley and Andrew Sherlock</i>
	Impact of Knowledge Exchange in Cross Regional Interdisciplinary Collaboration within a Robotic Development Project <i>Mohammed El Souri and James Gao</i>	Friction Stir Welding of Magnesium AZ31B and Aluminum Al-6062 <i>Mohammad Pervez Mughal, Amir Nawaz and Syed Farhan Raza</i>	Change Propagation and Associations Reconciliation Based on Feature Correspondences <i>Ameni Elataief, Borhen Louhichi, Sébastien Remy and Benoit Eynard</i>
	User-Centred Human-Robot Collaborative Handling of Small Parts in a MIM Process <i>Johan Kildal, Jorge Molina and Unai Andrés</i>	Study of process parameters on cutting forces in meso-scale milling of Inconel 718 alloy <i>Danyal Zahid, Najam ul Qadir, Syed Husain Imran Jaffery, Mushtaq Khan Shahid Ikram, Ullah Butt, Riaz Muhammad and Adil Rauf</i>	Inventory Optimisation Adoption amongst SMEs <i>Peter Drakeley and Professor Terrence Perera</i>
	Energy Consumption-based Trajectory Planning for Manipulators <i>Atef A. ATA</i>	Effects of Machining Parameters on Feed Direction Cutting Forces in Meso-Scale End-Milling of Ti-6Al-4V under Dry, Wet and MQL Environment <i>Adil Rauf, Syed Husain Imran Jaffery, Mushtaq Khan, Najam-ul-Qadir, Shamraiz Ahmed and Danyal Zahid</i>	The Role of Total Quality Management in Textile Industry <i>Samina Komal and Sameh M Saad</i>
		Stiffness Measurement of Parallel Kinematic Machines Considering Gravity Effect <i>Shakya Bandara, Yan Jin and Mien Van</i>	Modeling Simulation and Characterization of Hybrid Energy Harvester for Structural Health Monitoring Systems of Bridges <i>Waheed GUL, Sulaiman Tahir and Saqlain RAZZAQ</i>
19:00 – 22:00	Conference Gala Dinner – UNESCO World Heritage site, World’s First Modern Factory 300 Years Ago, UK		

Wednesday 7th of September 2022

09:30 – 12:00	Session 5: Keynotes Session – Chair: Mahmoud Shafik Auditorium: OL_1 University of Derby, Kedleston Road, Derby, DE22 1GB, UK		
	Who needs an Intelligent Factory? Toby Maw, Manufacturing Technology Centre, UK		
	Advanced Processing Routes for Netshape Manufacturing Khamis Essa, University of Birmingham, UK		
	Applications and Challenges of Robotic Disassembly Mozafar Saadat, University of Birmingham, UK		
	IoT and Smart Manufacturing Stephan Reiff-Marganiec, University of Derby, UK		
	Industry 4.0 and Beyond: Towards Connected Devices, and Self-learning Machinery, is Imitation Learning the Future of our Industry?! Mahmoud Shafik, University of Derby, UK		
12:00 – 13:00	Lunch Break - ATRIUM		
13:00 – 14:30	Session 6-A Information and Knowledge Management_1 Chair: Sameh Saad Co-chair: Uchenna Charles Onyema Auditorium: OL_1	Session 6-B Information and Knowledge Management_2 Chair: Konstantinos Salonitis Co-chair: Yagna Yashpalsinh Jadeja Auditorium: OL_2	Session 6-C Information and Knowledge Management_3 Chair: Yan Jin Co-chair: ThankGod Njoku Auditorium: HEAP
	Utilising Digital Twins for Increasing Military Supply Chain Visibility <i>Shehu Sani, Dirk Schaefer and Jelena Milisavljevic-Syed</i>	A Survey of Machine Learning Approaches for Visual Inspection on the DAGM Dataset <i>Philippe Carvalho, Alexandre Durupt and Yves Grandvalet</i>	Feature Reduction and Selection for use in Machine Learning for Manufacturing <i>Duaa Alrufaiha, Omogbai Oleghe, Mohammed Almanei, Sandeep Jagtap and Konstantinos Salonitis</i>
	Towards a Disciplinary Framework for Engineering and Manufacture <i>Emily Carey, Jana Sajdakova, Linda Newnes and Susan Lattanzio</i>	A Neural Network Approach to Predict Duration in Conformity for Predictive Manufacturing <i>Ahmed Abukar and Mozafar Saadat</i>	Research into Early-Stage Identification of Entrepreneurs: Educational Tools using Virtual and Augmented Reality <i>Stephen Robert PEARSON and Mahmoud SHAFIK</i>

	A Novel Approach to Evaluating Sustainability of Products and Associated Manufacturing Processes <i>Parakram Pyakurel, Fayyaz Reham and Robert Benham</i>	A Towards the implementation of the Digital Twin in Machining Process: Opportunities and Challenges <i>Raoudha Gaha, Alexnadre Durupt and Benoit Eynard</i>	Cyber Security Biometric Solution using Automatic Matching and Deep Learning <i>Sulaiman Alshebli, Mahmoud SHAFIK and Fatih Kurugollu</i>
	A Systematic Literature Review of the Concept of Circular Economic Readiness and a Proposed Circular Economy Readiness Scale <i>Carl Waring, Kapila Liyanage</i>	Capturing Manufacturing Knowledge Using Augmented Reality Technologies <i>Ahmed Sarhan, Lancelot Martin, Mohammed El Souri and James Gao</i>	Anomaly Detection System for Ethereum Blockchain Using Machine Learning <i>Njoku ThankGod Anthony, Mahmoud SHAFIK, Fatih Kurugollu and Hany F. Atlam</i>
	Identifying and Predicting Cybersecurity Threats in Industry 4.0 based on the Motivations towards a Critical Infrastructure <i>Adel Alqudhaibi, Abdulmohsan Aloseel, Sandeep Jagtap and Konstantinos Salonitis</i>	Research into Early-Stage Identification of Entrepreneurs and Artificial Intelligence: Towards Self-Sustained Tools to Identifying Young Entrepreneurs <i>Stephen Robert PEARSON and Mahmoud SHAFIK</i>	Emotions in Mental Healthcare and Psychological Interventions: Towards an Inventive Emotions Recognition Framework using AI <i>Hany F. ATLAM, Mahmoud SHAFIK, Fatih KURUGOLLU and Yasmin ELKELANY</i>
14:30 – 15:00	Coffee Break - ATRIUM		
15:00 – 16:30	Session 7-A Decision Support and Production Optimization_1 Chair: Khamis Essa Co-chair: Peter Thorvald Auditorium: OL_1	Session 7-B Decision Support and Production Optimization_2 Chair: James Gao Co-chair: Mahmoud Shafik Auditorium: OL_2	Session 7-C Composite Manufacturing and Machining Processes_2 Chair: Linda Newnes Co-chair: Yee Mey Goh Auditorium: HEAB
	Linking simulation-based LCA to manufacturing decision support: an iron foundry case study <i>Yu Liu and Anna Syberfeldt</i>	Development of a Maintenance Strategy to Optimise Maintenance in a World Scale Bioethanol Production Facility <i>Sameh M. Saad and Clarke Murray</i>	Understanding Chip Formation in Orthogonal Cutting of Aeronautical Thermoplastic CF/PEKK Composites based on Finite Element Method <i>Jia Ge, Wei Tan, Giuseppe Catalanotti, Brian G. Falzon, John McClelland, Colm Higgins, Yan Jin and Dan Sun</i>
	Maturity Model Development for Digital Servitization of Manufacturing SMEs <i>M.D. Khan, Dirk Schaefer and Jelena Milisavljevic-Syed</i>	A Framework of Key Stakeholders and their Influence on Sustainable Supply Chain Management Adoption <i>Samah Mourtaka and Mohamed Sabar</i>	Surface Roughness Analysis in High Speed Micro-milling of Monel 400 Alloy using Statistical Methods <i>Amjad Baid, Syed Husain Imran Jaffery and Mushtaq Khan</i>

	Implementing Pull Manufacturing in Make-To-Order Environments <i>Mohammed Almani, Omogbai Oleghe, Mohamed Afy-Sharaah and Konstantinos Salonitis</i>	Reconfiguration of Supply Chains in Today's Digital Era: A Review Paper <i>Sameh M. Saad and Dasunika Ubeywarna</i>	Multi-objective optimization of cutting parameters and toolpaths in pocket milling considering energy savings and machining costs <i>Hadhami BEN SLAMA, Raoudha GAHA and Abdelmajid BEN AMARA</i>
	An Assessment of Environmental-related Key Performance Indicators of the Chemical Industries <i>Alaa Alfarsi, Sandeep Jagtap and Konstantinos Salonitis</i>	Systematic Literature Review of SME Industry 4.0 Readiness Models <i>Zhanar Molgazhdarova and Diana Segura-Velandia</i>	A Comparison of the Effects of Stress Concentrations in Laser-cut PMMA under Static and Centripetal Loading <i>Robert Benham and Fayyaz Rehman</i>
	The Applications of AI in GSCM_ a Systematic Literature Review <i>Sameh M Saad and Mohamed Khamkham</i>	Circular Supply Chain: A Systematic Review <i>Salwa Assemblali and Mohamed Sabar</i>	
		Blockchain Technology - Understanding its Application in Humanitarian Supply Chains <i>Sameh Saad, Jemimah Maina, Terrence Perera and Ramin Bahadori</i>	
16:30 - 17:30	Session 5: Keynotes Session & Industrial Case Studies – Chair: Mahmoud Shafik		
	Auditorium: OL_1		
	University of Derby, Kedleston Road, Derby, DE22 1GB, UK		
	Preparing the manufacturing workforce of the future – from the perspective of a Manufacturer, Trainer, and Engineer Mr. Swapnil Khedekar, Festo GB, UK/ Mr. Babak Jahanbani/		
	Cognition constrained by virtual meeting media Mr. Ambar Randhawa, nuVa Enterprise, UK		
17:30 - 18:00	Conference Remarks, Best Paper ICMR 2021 and 2022, and Closing Session		
18:00 – 18:30	COMEh Meeting Chair: Andrew Thomas Co-chair: Fayyaz Rahman Auditorium: OL_1		

Thursday 8th of September 2022

10:00 – 15:00

**Session 8: Industrial Visits Sessions – Chair: Mahmoud Shafik
ATRIUM
University of Derby, Kedleston Road, Derby, DE22 1GB, UK**

Rolls Royce, Derby, UK

Alstom, Derby, UK

Jaguar Land Rover, Solihull, UK

15:00

End of ICMR 2022 Conference

Keynote Speakers



Ian Scott is a Formal Staff Technologist in the Design Technology Department of Rolls Royce, Ian attended John Port School, leaving in 1980 to join the Royal Air Force and was commissioned as a trainee Engineering Officer. He went to The City University, London, to do a thin sandwich degree in Air Transport Engineering. The placements included 29 Squadron with Phantoms and the BBMF. He left the RAF in 1986 to pursue a career in engineering. Ian first job was with the RB211-524G development team. Ian amongst other tasks, He ran the Fan Blade Containment Test, only the second RR had ever carried out. He moved to the Trent 700 Certification team in 1989 then moved to the Turbines section, and the next year joined the Turbine Design team as a designer. In this role, He spent time designing and optimising the film cooling of the HP Nozzle Guide Vanes amongst other tasks. In 1999 He took up a position in the central CAD team. He became an expert in the CADDSS5 design system, and deployed 2 upgrades across the company, which broadened my contacts internationally. He was a central member of the PLM selection team, and subsequently implemented several upgrades to PLM as well as generating many of the PLMOPs and BPs. In 2012, He was seconded to Transmissions to carry out some design work on the Trent 1000. He returned to Design Systems Engineering and carried on with the PLM/CAD support role. In 2012, he started developing User-Defined Features for Prelim Design Geometry generation.



Lina Huertas is currently the Manufacturing Industrial Advisor in Microsoft UK, helping UK manufacturers drive their digital transformation journeys and supporting new manufacturing markets in the UK through digitalisation. She has spent 15 years working in manufacturing innovation through digital technologies, helping shape the UK national strategy, forming and leading teams to drive digitalisation through novel capabilities, and delivering industrial projects involving simulation and data-based solutions for the sector. She is a Mechanical Engineer by training and completed her PhD on digital manufacturing from Loughborough University. She is a Fellow of the Institution of Mechanical Engineers.



Agus Budiyo is a Co-Chairman of ICTE (Indonesia Center of Technology Empowerment)", Agus received 4 degrees in aeronautics and astronautics from ITB (B-Eng and D-Eng) in Indonesia and MIT (MSc-AA and E.A.A.) in the US. His 30 years of experience include 15 years in academia. While serving as a professor (Foreign Professor, KKKU-Seoul, 2008-2015; A/Professor of Aerospace, RMIT Melbourne, 2015-2017), he actively engaged in different industries. Wrote 200+ papers and books (published by Springer) with 1747 citations and the H-index of 22. He has been playing roles in start-ups activities in the US, South Korea, and Indonesia where he co-founded and advises more than 10 technology SMEs. He helped many corporations (BUMNs, private companies, and Small Medium Enterprises (SME) in Indonesia while actively delivering invited talks, seminars, and workshops worldwide. He founded and serves as Chairman of CAP Solutions, a technology consulting company based in Jakarta.



Dr Toby Maw is a Technology Manager at the Manufacturing Technology Centre (MTC). His research background stemmed from a PhD in experimental physics from Loughborough University in the field of the characterisation of novel materials. He has over 10 years' digital metrology experience, having worked in an inspection software development team before joining the MTC as a Research Engineer. Toby now leads the Metrology 4.0 strategic research area within the Metrology and NDT department, as well as a cross disciplinary programme developing the MTC's Intelligent Factory capabilities. Throughout his MTC career, Toby has managed and technically led teams in projects across multiple

sectors, specialising in the areas of Digital Manufacturing, Digital Measurement Processes and Model Based Enterprise (MBE).



Professor Yi Qin is a Professor in Manufacturing Technology and Systems, Director of the Centre for Precision Manufacturing, at the University of Strathclyde, Fellow of The Institution of Mechanical Engineers, Editor-in-Chief of the Journal of Manufacturing Review, Associate Editor of the International Journal of Lightweight Materials and Manufacture. His interests in research and technological development are in the field of Materials Forming and Precision/Micro-Manufacturing. Prof. Qin has managed a series of large-scale funded RTD projects in

manufacturing (currently, project co-ordinator of the EU FAST-SMART Project), published over 250 technical articles, and given plenary addresses/keynote speeches in many conferences and workshops.



Yan Jin is a Professor of Smart Manufacturing and Robotics in the School of Mechanical and Aerospace Engineering at Queen's University Belfast. He is Director of Internationalisation of the school and a member of the school management group. Prof. Jin is a Fellow of Institute of Mechanical Engineers of UK. Professor Jin's research interest is in parallel robots, robotics automation, high performance machining, digital lean manufacturing, and production management. Prof. Jin has been an investigator for a number of research programmes, funded by DTI, EPSRC, Royal Academy of Engineering, EU H2020, Invest Northern Ireland and industry (e.g. EADS and Bombardier Aerospace Belfast). He is an

associate editor of IMechE Journal of Engineering Manufacture, a member of editorial board of Chinese Journal of Mechanical Engineering. He is a member of the prestigious EPSRC Early Career Forum in Manufacturing Research, a Marie Skłodowska-Curie fellow, and a member of technical committee of UK-RAS network. He is general chair of ICMR2019 and Parallel2020 international conferences, and he has been in the organising/programme committee of 20+ international conferences such as Romansy2022 and ICIEA2022. Prof. Jin has published over 130 peer-reviewed technical papers. He is a chartered engineer, chair of robotics committee in UK IFToMM, board member of IMechE MICG, and a member of IMechE and IEEE. Further information: <http://go.qub.ac.uk/YanJin>



Swapnil Khedekar is the Head of UK operation and part of cluster management for Northwest Europe for Festo. Mr. Khedekar is British-Indian living in the UK since 2001. He completed his Engineering Apprenticeship and graduated as Mechatronics Engineer from the University of De Montfort. He went on to complete his Master of Engineering from the Open University and continued his education with an EMBA from Cranfield University. Mr. Khedekar has held various positions from engineering to senior management over an industrial career of 22 years, giving a wide-ranging experience in the Automation Industry. He is accredited as Chartered Manager and was recently confirmed as a Fellow with Chartered Management Institute (CMI).



Mozafar Saadat is an Associate Professor in Automation and Robotics at the Department of Mechanical Engineering, School of Engineering, University of Birmingham. He holds an Honours degree in mechanical engineering from University of Surrey, and a PhD in manufacturing automation from University of Durham. His research interests are in the areas of industrial automation & robotics, and intelligent manufacturing. He is the Head of Automation and Intelligent Manufacturing (AIM) Research Laboratory with a number of active research groups in intelligent manufacturing, autonomous remanufacturing, and medical robotics including robotic rehabilitation, and assistive reproductive technologies. His recent innovations have resulted in filing of three patents either granted or pending in EU and USA. In 2020 he set up, and is the Technology Director of a spinout medical technology company based at Birmingham Research Park with significant grant funding from Innovate UK and in collaboration with University of Birmingham. His previous research experience included aerospace manufacturing, and in particular, aircraft wing assembly automation. He has obtained various research funding from EU, EPSRC, Innovate UK, and a number of companies such as British Aerospace, Airbus, and Mitac. He has published in excess of 150 scientific papers in prestigious journals and international conferences and has supervised ~30 PhD students.



Khamis Essa is a Professor of Digital Manufacturing and the Director of the Advanced Manufacturing Group at the School of Engineering, the University of Birmingham. His research is focused on advanced manufacturing technologies for instance metal and ceramic Additive Manufacturing (AM), Hot Isostatic Pressing (HIPing) and Incremental Sheet Forming (ISF). He has been developing novel manufacturing routes and applications for aerospace, defence, automotive and biomedical industries. The scientific emphasis of his research is on material and process interaction. He has been also developing holistic modelling for comprehensive understanding of process and material behaviours. His research portfolio has a research income in excess of £14M. His research has been supporting major companies across the world including Rolls-Royce, BAE Systems, MBDA Missiles, MicroTurbo, Ford, European Space Agency and Caterpillar. He has been also supporting Small to Medium enterprises through major ERDF funding programmes such as CASIM2 and SmartFub. Dr Essa has over 100 journal and conference publications in addition to three patents and two book chapters.



Stephan Reiff-Marganiec is a Professor in Computer Science and Head of School of Computing and Engineering at the University of Derby. My responsibility includes oversight of teaching and research in the school; my ambition is to continue evolving all subject areas in the school to further strengthen the interaction of teaching, research, and knowledge exchange and create greater interaction between the subject areas in the school and beyond to address current opportunities and challenges in an ever-better-connected world. I strongly believe that interweaving the strands will lead to a strong impact on the local economy while providing great opportunities for our students and furthering our applied research agenda. Prior to joining the University of Derby, I worked in a dual role at the University of Leicester, leading the Leicester Innovation Hub whilst being an Associate Professor in Informatics. As an Associate Professor, I was engaged in research and teaching in areas of web and cloud systems as well as IoT, leading the MSc course portfolio and international outreach. As Director of the Innovation Hub, I led industry engagement, focused on regional SMEs, across all subject areas at the University.



Mahmoud Shafik is a Professor AC in Intelligent Mechatronics Systems and Digital Technology. Shafik is an international expert with more than 20-years industrial applied research experience. He has been chairing, leading, and delivering several industrial applied research projects from European Commission, Innovate-UK and UK Research Councils. His research work has brought many innovative outcomes that have been commercially explored by several Small to Medium and Large enterprise organisations across the world. He has several publications in international world leading journals and conferences and a number of industrial notes. He has also few patents in his areas of industrial applied research, sustainable engineering, and digital technology. Shafik is one of the lead development members of the Institute of Innovation in Sustainable Engineering at the University of Derby & founder and Editor-In-Chief of the International Journal of Robotics and Editor-In-Chief of Journal of Traffic and Logistics. He is the plenary speaker of International Conference in Intelligent Traffic and Transportation, and the programme chair of the 2022 – 19th international conference in manufacturing research (ICMR2022). Shafik is currently leading a number of industrial applied research programmes focusing on industrial 4.0, smart manufacturing, digital healthcare, robotics, and industrial automation applications. He has been supervising and external examiners for several PhD, and MSc research students across UK and worldwide. He is also serving as an Assessor and Knowledge Transfer Expert for the UK Knowledge Transfer Network, EPSRC, Innovate-UK and EC Programmes. Shafik is a visiting professor to a few universities in EU, China, and Middle East. He is the Principal Investigator of the University of Derby and hold the position of University Reader at the College of Engineering and Technology. He is also a committee member of The Consortium of UK University Manufacturing and Engineering (COMEHE) for the Engineering Professors' Council.