MaDE2022 Programme

Tuesday 25 January 2022

8:00 AM - 9.00 AM	**Registration Opens**		
9:00 AM - 9:30 AM	**Conference Opening (Great Room 4)** MIHI: TBC| OFFICIAL OPENING: Professor Jim Metson, Deputy Vice Chancellor - Research, The University of Auckland Session Chair: Professor Olaf Diegel, MaDE2022 Co-Chair and Director of The University of Auckland's Creative Design and Additive Manufacturing Lab		
9:30 AM - 10:00 AM	**Keynote Speaker: Frances Valintine CNZM (CEO and Founder, Tech Futures Lab)** **TALK TITLE TBC** Session Chair: Professor Olaf Diegel, MaDE2022 Co-Chair and Director of The University of Auckland's Creative Design and Additive Manufacturing Lab Room: Great Room 4		
10:00 AM - 10:30 AM	**Morning Tea (Great Room 1) - sponsored by University of Waikato** **Poster and Exhibition Viewing**		
10:30 AM -12:30 PM	**CONCURRENT CONFERENCE SESSION 1**		
	Industry 4.0 - NZ Manufacturing Session Co-Chairs: Nick Pickering and Jan Polzer Room: Great Room 2	Advances in Additive Manufacturing Session Co-Chairs: Jérôme Leveneur and Juan Schutte Room: Great Room 3	Commercialisation and Value-Add Session Co-Chairs: Jim Johnston and Mike Duke Room: Great Room 4
	INDUSTRY 4.0 REQUIREMENTS BEYOND THE PANDEMIC HORIZON - Frank Phillips, LMAC New Zealand Ltd	INDUSTRY APPLICATIONS FOR MULTI JET FUSION – ENABLING THE BENEFITS OF HP MJF FOR ADDITIVE MANUFACTURING - Jonathan Zyzalo, EVOK3D NZ	FROM A BRIGHT IDEA, THROUGH R&D TO A COMMERCIAL COMPANY: THE JOURNEY OF INHIBIT COATINGS LTD. - Jim Johnston, Victoria University of Wellington
	HORTICULTURE SYSTEM OF SYSTEMS IMPLEMENTING AN AUTONOMOUS SURVEY ROBOT AND ORCHARD DIGITAL TWIN - Nick Pickering, University of Waikato	A SUSTAINABLE METHOD FOR CREATING 3D FORM UTILISING NATURAL SHRINKAGE AND THE PRECISION OF DIGITAL DEPOSITION - Nayanathara Kuruppuarachchi, Victoria University of Wellington	LEANING ON STRENGTHS AND PARTNERING FOR SUCCESS - Matt Bradley, Blender
	INDUSTRIAL REVOLUTIONS - RISE OF THE MACHINES AND THE ROLE OF HUMANS - Allan Orr, Aspect PT	ADVANCED PLASMA STRATEGIES FOR SPATIAL ADDITIVE MANUFACTURING OF TENSILE STRUCTURES - Jérôme Leveneur, GNS Science	COMPANY GROWTH ... WITH A LITTLE HELP FROM INNOVATIVE SUPPLIERS! - Anne Staal, AUT
	THE PHARMA INDUSTRY 4.0: BLOCKCHAIN APPLICATION IN UPSTREAM SUPPLY CHAIN - Amirhossein Mostofi, Victoria University of Wellington	GENERATIVE DESIGN OF PROGRAMMED MATERIALS FOR CONTROLLED FREQUENCY RESPONSES - Wuxin Yang, AUT	OPPORTUNITY FOR AN AGRI-ROBOTICS INNOVATION ECOSYSTEM IN NEW ZEALAND - Mike Duke, University of Waikato
	DEFINING AN APPROPRIATE PROCUREMENT MATURITY MODEL TO ASSESS AND IMPROVE INNOVATION PROCUREMENT IN FAST-GROWING/FRONTIER FIRMS IN NEW ZEALAND - Elizabeth McGill, AUT	AUTOMATING COMPLEXITY WITH nTOPOLOGY - Juan Schutte, CDAM Lab, The University of Auckland	MAKING MAKERS AND MAKING ENGINEERS: SEEDING THE NEXT GENERATION OF ENGINEERS THROUGH HANDS-ON SKILLS - Mark Jeunnette, The University of Auckland
	SHOESTRING - SMART AUTOMATION FOR LEGACY MACHINES AT THE EXAMPLE OF A PIPE WELDING MACHINE - Jan Polzer, The University of Auckland	HIGH PERFORMANCE CONTINUOUS FIBRE COMPOSITE 3D PRINTING: PROTOTYPING AND PROCESS CHARACTERISATION - Josh Hares, CACM, The University of Auckland	FOILING OR FAILING: IT'S A FINE LINE – UNIVERSITY/INDUSTRY ENGAGEMENT, HOW HARD CAN IT BE? - Graeme Finch, CACM, The University of Auckland
	AUGMENTED REALITY AND IoT - DRIVING TRANSFORMATION AT SCALE - Kevin Marett, LEAP Australia	ADDITIVE MANUFACTURE OF CEMENTITIOUS MATERIALS - Joel Epps, University of Canterbury	A CASE STUDY OF THE COMMERCIAL REALITIES OF POLYMER ADDITIVE MANUFACTURING PRODUCTION, AKA "TALES FROM A SERVICE BUREAU" - Derek Manson, Fi Innovations
	HUMAN CAPITAL 4.0: THE NEW CONCEPT AND NEW COMPETENCE TYPOLOGY FOR THE WORKFORCE IN INDUSTRY 4.0 - Emmanuel Flores, The University of Auckland	FUNCTIONALLY GRADED CORE MATERIAL AND HARD-POINT INTERFACES FOR COMPOSITE SANDWICH PANELS - Ben Murton, University of Canterbury	ADDING VALUE TO THE SAWMILL PROCESS THROUGH VISION SCANNING - Daniel Kulasingham, Sequal
12:30 PM - 1:30 PM	**Lunch (Great Room 1) - sponsored by Fisher and Paykel Healthcare** **Exhibition Viewing**		
1:30 PM - 2:00PM	**Keynote Speaker: Matt Darley (Recovery Systems Manager, Rocket Lab)** **TURNING ROCKET LAB'S ELECTRON ROCKET INTO A REUSABLE LAUNCH VEHICLE** Session Chair: Professor Jim Johnston, MaDE2022 Co-Chair and Professor - School of Chemical and Physical Sciences, Victoria University of Wellington Room: Great Room 4		
2:00 PM -3:30 PM	**CONCURRENT CONFERENCE SESSION 2**		
	Applications in Additive Manufacturing Session Co-Chairs: Don Clucas and Troy Dougherty Room: Great Room 2	Design Innovations Session Co-Chairs: Tim Miller and Craig Shannon Room: Great Room 3	Innovations in Manufacturing Session Co-Chairs: Emilio Callius and Simon Bickerton Room: Great Room 4
	VAT-BASED 3D PRINTING OF ELECTROACTIVE POLYMERS - Kyle Engel, The University of Auckland	A ROBOTIC 3D/4D PRINTING CONSTRUCTION METHOD TO CREATE SUSTAINABLE LARGE SCALE TEMPORARY STRUCTURES - Tim Miller, Victoria University of Wellington, School of Design Innovation	METAMATERIALS, ADDITIVE MANUFACTURING AND DESIGN IN MECHANICAL ENGINEERING - Emilio Calius, AUT
	FDM PRINTING OF POLYLACTIC ACID: TENSILE TESTING OF STRENGTH CONFIGURATIONS FOR MECHATRONICS - Benjamin Orwin-Higgs, Massey University	VIRTUAL REALITY AS A DESIGN TOOL - Ben Thomsen, Blender	MANUFACTURING RELATED DEFECTS IN CARBON FIBRE REINFORCED PLASTIC STRUCTURES – WHERE AND WHY THEY OCCUR, AND DO THEY MATTER? - Simon Bickerton, CACM, The University of Auckland
	SCREEN PRINTING FOR ADDITIVE MANUFACTURING OF TITANIUM PARTS - Don Clucas, University of Canterbury, Mechanical Engineering Department	INSOURCING VS OUTSOURCING AND BLENDED TEAMS - DELIVERING VALUE FOR PRODUCT DEVELOPMENT IN A CHANGING POST-COVID WORLD - Craig Shannon, Globex Engineering	NANOFIBRE VEILS FOR INCREASED PERFORMANCE OF COMPOSITES - Gareth Beckermann, Nanolayr Ltd.
	NOVEL COMPOSITE-METAL ADDITIVE MANUFACTURING - Troy Dougherty, Nuenz	INNOVATION IN DESIGN AND MANUFACTURING WITH DIGITAL KNIT TECHNOLOGIES - Frances Joseph, AUT	RAPID PROTOTYPE ADOPTION AT FISHER & PAYKEL HEALTHCARE - Andrew Lee, Fisher & Paykel Healthcare Ltd
	SELECTIVE LASER MELTING OF HIGH PURITY COPPER ON A LOW COST, LOW POWER 250-WATT MACHINE - Tim Gordon, The University of Auckland	THE FUTURE OF DESIGN? BURGEONING DESIGNERS' EXPERIENCE OF 'ADVANCED' DIGITAL DESIGN TOOLS - Nicholas Emerson, University of Canterbury	RECYCLED TEXTILE FIBRE AS A PERFORMANCE-ENHANCING ROADING ADDITIVE - Deborah Crowe, Usedfully
	SCREEN 3D PRINTING CELLULOSE GEL - Hossein Najaf Zadeh, University of Canterbury	CREATIVE STEM PATHWAYS: 3D PRINTING AND DESIGN FOR PASIFIKA STEM EDUCATION - Lionel Taito-Matamua, Victoria University of Wellington, School of Design Innovation	A COST-EFFECTIVE HYBRID APPROACH FOR THE MANUFACTURING OF HIGH-PERFORMANCE INJECTION MOULD INSERTS USING THE LASER POWDER-BED FUSION PROCESS - Simon Chan, CDAM Lab, The University of Auckland
3:30 PM - 4:00 PM	**Afternoon Tea (Great Room 1)** **Poster and Exhibition Viewing**		
4:00 PM - 5.00 PM	**PANEL DISCUSSION 1** **TOPIC: SUSTAINABILITY AND THE CIRCULAR ECONOMY – LOOKING BEYOND THE HORIZON** Room: Great Room 4 ADJUDICATOR: Marcel Schaefer – MaDE2022 Co-chair and Programme Director, BEngTech, Mechanical Engineering, AUT PANELLISTS: Gabriela Baron – Lecturer, Design Programme, The University of Auckland Jeffrey Seadon – Senior Lecturer, School of Future Environments, AUT John Kennedy – Ion Beam Physics Research Scientist, GNS Science Rachel Barker – CEO, Plastics New Zealand Rebecca Percasky – CEO, The Better Packaging Co.		
5:00 PM - 5:30 PM	**No activity planned**		
5:30 PM - 7:00 PM	**Student Innovation Showcase (Happy Hour) - sponsored by Auckland Unlimited**		
6:00 PM - 7:00 PM	**Pre-dinner drinks**		
7:00 PM - 10:00 PM	**Conference Dinner (Great Room 4) - sponsored by Beckhoff Automation Ltd. | Dinner Welcome:** Professor Jim Johnston | **Key Dinner Address:** David Downs (CEO - The New Zealand Story)**: FROM NUMBER 8 TO GREAT! HOW NZ'S HISTORY AS AN INNOVATIVE COUNTRY HAS SET US UP FOR SOME**		

Wednesday 26 January 2022

8:30 AM - 9:15 AM	**Registration Opens**		
9:15 AM - 9:30 AM	**Introduction of Day (Great Room 4)** Session Chair: Doctor Marcel Schaefer, MaDE2022 Co-chair and Programme Director, BEngTech, Mechanical Engineering, AUT		
9:30 AM - 10:00 AM	**Keynote Speaker: Bronwyn Fox (Chief Scientist, CSIRO and prev. Deputy Vice-Chancellor, Swinburne University)** **TITLE TBC** Session Chair: Doctor Marcel Schaefer, MaDE2022 Co-chair and Programme Director, BEngTech, Mechanical Engineering, AUT Room: Great Room 4		
10:00 AM - 10:30 AM	**Morning Tea (Great Room 1) - sponsored by University of Canterbury** **Poster and Exhibition Viewing**		
10:30 AM -12:00 PM	**CONCURRENT CONFERENCE SESSION 3**		
	Manufacturing and Innovation Session Co-Chairs: Holger Heinzel and Jyoti Kalyanji Room: Great Room 2	Manufacturing and Design Circularity Session Co-Chairs: Oliver McDermott and Gabriela Baron Room: Great Room 3	Materials and Surfaces Session Co-Chairs: Maedeh Amirpour and Hamed Abdoli Room: Great Room 4
	NOVEL ANTIMICROBIAL FILTER MEDIA MADE OF ELECTROSPUN NANOFIBRES PROTECTING AGAINST BIOLOGICAL OR NON-BIOLOGICAL AIRBORNE PARTICLES - Fabrice Karabulut, Nanolayr Ltd.	CIRCULAR MANUFACTURING - BUSINESS MODEL INNOVATION - Oliver McDermott, Blender	THERMOGRAPHY INSPECTION FOR UNDERCOATING CORROSION - Larissa Kopf, University of Waikato
	ROBOTIC WELDING IN STEEL FABRICATION - Holger Heinzel, HERA	DESIGNING FOR A LOW-EMISSIONS CIRCULAR ECONOMY - Rachel Barker, Plastics NZ	DEVELOPMENT OF COATING-FREE SUPER WATER-REPELLENT MICROPATTERNED ALUMINIUM FOR SPONTANEOUS DROPLET MOTION - Kirill Misiiuk, University of Otago
	UNDERSTANDING ASSUMPTIONS IN THE PRODUCT DEVELOPMENT PROCESS - Abhishek Makker, Oasis Engineering	DESIGN FOR PURPOSE: DEMATERIALISING WELLBEING THROUGH DESIGN - Gabriela Baron, The University of Auckland, Design Programme	RATIONAL DESIGN OF GEOMETRY TAILORED LATTICES WITH APPLICATION IN HUMAN INTERFACES - Maedeh Amirpour, CACM, The University of Auckland
	PERFORMANCE IMPROVEMENTS IN REFRIGERATIVE DEHUMIDIFICATION TECHNOLOGY USING A 3D-PRINTED ENERGY RECOVERY HEAT EXCHANGER - Sam Lowrey, University of Otago	A DESIGN-BASED APPROACH TO UPCYCLING AGRICULTURAL PLASTIC WASTE - Danielle Patterson, Victoria University of Wellington	ACHIEVING A GOOD ADHESION BETWEEN DISSIMILAR MATERIALS UTILISING SIMPLE SURFACE TREATMENTS AND ENVIRONMENTAL-FRIENDLY ADHESIVE - Ardeshir Saniee, AUT
	BEYOND WOOLLY JUMPERS: EXPLORING THE ADDITIVE FABRICATION CAPABILITY OF DIGITAL KNITTING TECHNOLOGY - Jyoti Kalyanji, AUT	BREAKING THE CYCLE OF NITRATE POLLUTION: REDUCTION, RECAPTURE AND REUSE - Handayani Putri Fraser, Victoria University of Wellington	HYBRID COMPONENTS: ENHANCING BONDING STRENGTH BETWEEN 3D-PRINTED ALUMINUM SUBSTRATES AND CARBON FIBRE REINFORCED PLASTICS - Hamed Abdoli, CACM, The University of Auckland
	DESIGN AND MANUFACTURING PROCESS FOR A PASSIVE-FLEXIBLE FLIPPER FOR MARINE TURTLES - Nick Van Der Geest, AUT	ADDING VALUE: UPCYCLING PROBLEMATIC PLASTIC WASTE THROUGH DIGITAL CRAFT - Huy Tim (presenter Jeongbin Ok), Victoria University of Wellington	APPLICATION OF 3D DIGITAL PHOTOGRAMMETRY TO QUANTIFY THE SURFACE ROUGHNESS OF MILK POWDER - Wei Yu, The University of Auckland
12:00 PM - 1:00 PM	**Lunch (Great Room 1) - sponsored by Fisher and Paykel Appliances** **Exhibition Viewing**		
1:00 PM - 1:30 PM	**Keynote Speaker: Kahl Betham (CEO, Gallagher)** **THE GALLAGHER SUCCESS STORY** Session Chair: Professor Jim Johnston, MaDE2022 Co-Chair and Professor - School of Chemical and Physical Sciences, Victoria University of Wellington Room: Great Room 4		
1:30 PM - 3:00 PM	**CONCURRENT CONFERENCE SESSION 4**		
	Healthcare Applications Session Co-Chairs: Paul Ewart and George Stilwell Room: Great Room 2	Industry Collaborations and Commercialisation Session Co-Chairs: Thomas Borrmann and Mark Battley Room: Great Room 3	
	FISHER & PAYKEL HEALTHCARE EVORA NASAL MASK - A DESIGN JOURNEY - Jordan Kimpton, Fisher & Paykel Healthcare Ltd	FROM THE LAB TO A PILOT PLANT – A GEOTHERMAL STORY - Thomas Borrmann, Victoria University of Wellington	
	DESIGN OPTIMISATION OF AN INTRAOSSEOUS NEEDLE FOR TRAUMA AND EMERGENCY MEDICINE - Lorenzo Garcia, AUT	GEOTHERMAL WELL OPTIMIZATION USING AN INTEGRATED BINARY PROCESS AND RESERVOIR MODEL - Brent Young, The University of Auckland	
	THE USE OF ENGINEERING THEORY AND SENSOR TECHNOLOGIES TO DEVELOP SPORTS EQUIPMENT TESTING TECHNIQUES - Paul Ewart, Wintec Ltd	BETTER AND SAFER BOATS AND BUILDINGS THROUGH EFFECTIVE INDUSTRY-UNIVERSITY RELATIONSHIPS - Mark Battley, CACM, The University of Auckland	
	COMPARISON OF MULTIDIRECTIONAL ISOMETRIC STRENGTH FOR PEOPLE IN A SEATED POSITION USING A SIMPLE ANALYTICAL MODEL AND EMPIRICAL RESULTS - George Stilwell, University of Canterbury	NZ PRODUCT ACCELERATOR: BRINGING TOGETHER NZ TO BUILD INNOVATION - Harshpreet Singh, NZPA	
	ARTIFICIAL MUSCLES FOR SOFT REHABILITATION SYSTEMS: A MANUFACTURING PROCESS OF TWISTED AND COILED POLYMERS ACTUATORS WITH NiCr RESISTANCE WIRE - Alberto Gonzalez Vazquez, AUT	THE JOURNEY OF INNOVATION – HOW TO IMPLEMENT NEW INNOVATIVE TECHNOLOGIES IN YOUR COMPANY - Nathaniel McTaggart, Auckland District Health Board	
	FROM BENCHTOP TO BEDSIDE: A CASE STUDY ON COMMERCIALISING A MEDICAL DEVICE - Deborah Munro, University of Canterbury, Mechanical Engineering	TITANIUM THERMAL PROTECTION SYSTEM FOR SMALL RE-ENTRY VEHICLES - Philipp Nieke, The University of Auckland	
3:00 PM - 3:30 PM	**Afternoon Tea (Great Room 1)** **Exhibition pack-down commmences**		
3:30 PM - 4:30 PM	**PANEL DISCUSSION 2** **TOPIC: ADVANCED MANUFACTURING TRANSFORMATION IN NZ – THE INDUSTRY-RESEARCH NEXUS** Room: Great Room 4 ADJUDICATOR: Rachael Tighe – Senior Lecturer, Mechanical Engineering, University of Waikato PANELLISTS: Catherine Beard – Director of Advocacy, BusinessNZ Frank Phillips – Advanced Manufacturing Manager, LMAC Consulting NZ Hunter Nottage – Policy Director and Advanced Manufacturing ITP Lead, MBIE Johan Potgieter – Professor of Robotics, School of Food and Advanced Technology, Massey University Centre for Advanced Manufacturing Kahl Betham – CEO & Executive Director, Gallagher		
4:30 PM - 5:00PM	**Awards and Conference Closing - sponsored by GNS Science** **Session Co-Chairs: Professors Jim Johnston and Olaf Diegel**		
5:00 PM	**Post-conference Cocktails - sponsored by MaDE NZ**		

Poster Presentations

RESILIENCE FOR NEW ZEALAND MANUFACTURING (FUTURE MANUFACTURING/BUSINESS MODELS)	GENERATION OF BIOGAS USING FIXED-DOME ANAEROBIC DIGESTER FOR SMALL-SCALE INDUSTRIAL APPLICATIONS IN NEW ZEALAND - Jai Khanna, Waikato Institute of Technology (Wintec)
UNIVERSITY, CRI, INDUSTRY R&D COLLABORATIONS	(ACADEMIC LEADERSHIP + TECHNICAL SUPPORT) × STUDENT LEARNING OPPORTUNITIES = RESEARCH AND DEVELOPMENT TO INDUSTRY - Lauane Andrade, Waikato Institute of Technology (Wintec)
	OPTIMISATION OF SENSORY FACTORS AND ENVIRONMENTAL PERFORMANCE OF FOOD PRODUCTS: A CASE STUDY OF A VEGETABLE-BASED PATTY - Madison Franks, Massey University
INDUSTRY 4.0	EDGE COMPUTING-ENHANCED DIGITAL TWIN FOR SMART MANUFACTURING - Huiyue Huang, The University of Auckland
	A FLEXIBLE MONITORING SYSTEM FOR MACHINERY HEALTH MANAGEMENT IN INDUSTRY 4.0 FRAMEWORK - Minjung Kim, The University of Auckland
INNOVATIONS IN MANUFACTURING AND DESIGN	MEASURING MOISTURE INGRESS INTO HOUSINGS FOR LONG-TERM WIRELESS IMPLANTABLE SENSORS - Simon Blue, University of Canterbury
	INVESTIGATION OF CONDENSATION-FROSTING ON COATING-FREE TOPOGRAPHIC WETTING GRADIENTS FOR HEAT TRANSFER SURFACE APPLICATIONS - Chris Hughes, University of Otago
	FINITE ELEMENT ANALYSIS METHODS IN SPINAL FUSION - Sebastian Jones, University of Canterbury
	MULTI-AXIS SPIN COATING ON CURVED SURFACES - Finn Mcintyre, University of Canterbury
	ARTIFICIAL INTELLIGENCE AND MULTI-MATERIAL 4D PRINTING IN PHYSICAL FILM DESIGN AND MANUFACTURE - Andrew Roberts, Victoria University of Wellington
	THE USE OF 4D-PRINTING TO PRODUCE MYCELIUM ('FUNGI ROOTS') MATERIALS - Deane Thomas, University of Canterbury
DESIGN FOR MANUFACTURING	DESIGN, MANUFACTURING AND MECHANICAL TESTING OF SMALL-SCALE WIRELESS CHARGING PADS FOR ROADWAYS - Kai-Yeung Li, The University of Auckland
	CONCURRENT OPTIMISATION TOOLS FOR MULTI-PART COMPOSITE YACHT STRUCTURES - Tobias Lorimer, The University of Auckland
ADDITIVE MANUFACTURING AND DESIGN INCLUDING 3D AND 4D	CREATING A LIVING 4D PRINTING PLATFORM - Chris Bainbridge, The University of Auckland
	MATERIAL AND STRUCTURAL TAILORING WITH ADAPTIVE BIO-BASED MATERIALS AND ADDITIVE MANUFACTURING FOR ENHANCED COMFORT OF PROSTHETICS AND ORTHOTICS - Dayna Cracknell, The University of Auckland
	POST-PRODUCTION MECHANICAL PROPERTY MODIFICATION OF "LIVING" GELS VIA PET-RAFT - Patrick Imrie, The University of Auckland
	PLASTIC IN PRACTICE: AN EMPIRICAL APPROACH TO 3D PRINTED UPCYCLING IN NEW ZEALAND SCHOOLS - Maddison Jessop-Benseman, Victoria University of Wellington
	FAST HYDROLYTICALLY DEGRADABLE 3D PRINTED OBJECT BASED ON ALIPHATIC POLYCARBONATE THIOL-YNE PHOTORESINS - Yimei Wu, The University of Auckland
	APPLICATION OF PURE TITANIUM COATINGS FOR MEDICAL PURPOSES - Hong Zhou, Waikato Institute of Technology (Wintec)
MANUFACTURING PROCESSES AND TECHNOLOGIES INCLUDING ROBOTICS, AUTOMATION AND VIRTUAL	REMOTE ACCESS AND CONTROL OF PLC LAB EQUIPMENT - Praneel Chand, Waikato Institute of Technology (Wintec)
	DESIGN OF A LOW-COST SOIL DRYING OVEN - Praneel Chand, Waikato Institute of Technology (Wintec)