13th International Symposium on Friction Stir Welding (V6)

	TUESDAY 21 May 2024 (Morning)					
8.00 onwards	REGISTRATION					
	Room B-1					
Session 1	**Plenary I** Chairs: Hidetoshi Fujii and Jonathan Martin					
09.00➢09.20	Welcome and Opening Remarks					
	Author(s)	**Affiliation**	**Paper title**			
09.20➢09.50	**Axel Meyer**	Riftec	20 years of industrial production of friction stir welded products - from first references to recent innovations			
09.50➢10.20	**Yuri Hovanski**	Brigham Young University	Production Evaluation of RFSSW Automotive Door Assembly			
	Room B-1			Room B-2		
Session 2	**Techniques I** Chair: Kevin Colligan			**Dissimilar I** Chair: Dr Max Hoßfeld		
	Author(s)	**Affiliation**	**Paper title**	**Author(s)**	**Affiliation**	**Paper title**
10.40➢11.00	**Piyush Upadhyay** Hrishikesh Das Shivakant Shukla Mitch Blocher	Pacific Northwest National Laboratory	Enabling 3T Friction stir lap welding of Aluminum alloys at high speeds.	**Toshiaki Yasui** Hiroyuki Nojiri Sota Hatanaka	Toyohashi University of Technology	Influence of welding tool shape on butt weld interface between steel and aluminum by friction stir welding
11.00➢11.20	**Shoji Matsumoto** Ippei Sato Naonori Shibata Tetsuya Saruwatari Naruhito Matsumoto	Keihin Ramtech Co Ltd	Basic characteristics and future prospects in Synchronized Stir Welding	**Brayden Terry** Alvin Strauss	Vanderbilt University	Dissimilar Friction Stir Welding of Thin Sheet Nitinol and Ti-6Al-4V
11.20➢11.40	**Takuya Miura** Yoshiaki Morisada Kohsaku Ushioda Hidetoshi Fujii	Joining and Welding Research Institute, Osaka University	Friction stir welding of steel with efficiently water-cooled steel tool	**Robin Göbel** Martin Werz Stefan Weihe	Materials Testing Institute (MPA) University of Stuttgart	Enhancing weld quality in friction stir welding of hybrid aluminum-steel tailor welded blanks - tool material influence on process robustness
11.40➢12.00	**Dominik Walz** Martin Werz Stefan Weihe	MPA University of Stuttgart	Development and optimization of a welding gun for friction stitch welding in automotive applications	**Sanjay Krishnamurthy Channappa** Sophie Rylandt Aude Simar	Université Catholique de Louvain	Significance of Friction Melt Bonding for joining dissimilar titanium and aluminum alloys

13th International Symposium on Friction Stir Welding (V6)

TUESDAY 21 May 2024 (Afternoon)

	Room B-1			Room B-2		
Session 3	**Steel I** **Chair: Dale Fleck**			**Additive I** **Chair: Frank Pfefferkorn**		
	Author(s)	**Affiliation**	**Paper title**	**Author(s)**	**Affiliation**	**Paper title**
13.00➢13.20	**Lucas Oppeneiger**[1] Ozan Caliskanoglu[1], Christian Pfeiffer[1], Gregory Toguyeni[2] Santonu Ghosh[3]	Stirtec GmbH[1] Subsea 7 France[2] Element Six UK Ltd[3]	Friction stir welding of steel for pipeline fabrication using different tool materials	**Frank Pfefferkorn**[1] Aishwarya Deshpande[1], Christian Baumann[2], Sabine Schwarz[2], Stephan Krall[2], Friedrich Bleicher[2]	University of Wisconsin-Madison[1] TU Wien[2]	Material flow and consolidation behavior of metal cutting chips during friction surfacing
13.20➢13.40	**Santonu Ghosh**[1], Branislav Dzepina[1], Ali Khaghani[1], Stephen Cater[2]	Element Six UK Ltd[1] TWI Ltd[2]	Influence of plate thickness on the friction stir welding of steel using PCBN FSW tool.	**Saed S. Rezaeinejad** Ton Bor, Martin Luckabaue Remko Akkerman	University of Twente	Post-Deposition Heat Treatment Effects on Friction Screw Extrusion Additive Manufacturing of an Al-Mg-Si Alloy
13.40➢14.00	**Takayuki Yamashita**[1] Wu Gong[2], Stefanus Harjo[2] Kohsaku Ushioda[1], Hidetoshi Fujii[1]	Osaka University[1] Japan Atomic Energy Agency[2]	Deformation and transformation behaviors in stir zone of friction stir welded medium Mn steel monitored by in-situ neutron diffraction	**Ismail Zabeeullah Kolimi**[1] Julie Marteau[1], Salima Bouvier[1], Pierre Auguste[2] Fabien Lefebvre[2], Eric Nivet[2]	Université de technologie de Compiègne[1] Technological Institute of Mechanisms (CETIM)[2]	Printability of Titanium Alloy Ti64 by Additive Friction Stir Deposition: Study of mechanical behaviour with linkages to local microstructures.
14.00➢14.20	**Mori Masakazu**[1] Yoshiaki Morisada[2], Hidetoshi Fujii[2]	Ryukoku University[1] Osaka University[2]	Effect of GAP on steel joint formation by friction stir welding	**Abhishek Sharma** Yoshiaki Morisada, Kohsaku Ushioda, Hidetoshi Fujii	JWRI, Osaka University	Correlation between the thermal stability of $Al_{13}Fe_4$ intermetallic phase and mechanical properties of the Al-Fe alloy fabricated via friction stir alloying
Session 4	**Applications** **Chair: Mike Russell**			**Performance** **Chair: Laurent Dubourg**		
14.40➢15.00	**Yuri Hovanski**[1] John Hunt[2] Enkhsaikhan Boldsaikhan[3] Dwight Burford[4] Frank E Pfefferkorn[5]	Brigham Young University[1] TWB[2], Wichita State University[3], University of North Texas[4], University of Wisconsin-Madison[5]	Establishing Generalized in Process Quality for Friction Stir Welding	**Stefan Böhm** Niklas Sommer	University of Kassel	Tailoring microstructure, precipitation behavior and hardness of high-strength aluminum alloys using operando techniques
15.20➢15.20	**Pedro de Sousa Santos**	TWI Ltd	Development of friction stir welding for the large scale production of SiC power electronics for the next generation of electric vehicles - The SCIENZE project	**Naoki Takeoka**[1] Tomo Ogura[2] Tomoki Matsuda[2] Akio Hirose[2]	Kawasaki Heavy Industries, Ltd[1] Osaka University[2]	Analysis of Mechanical Properties of Aluminum alloy / Various Strength Steel Joints Using Scrubbing Refill Friction Stir Spot Welding
15.20➢15.40	**Jacques-Erwan Ducatez**[1] David Chartier[1], Frank Eberl[2], Julien Laye[3]	Airbus Atlantic[1] Constellium Issoire[2] Constellium[3]	AIRWARE® FSW Tailored-Welded-Blank for High Performance and Cost-Efficient Stiffened Panel for Aerospace Applications	**Jhoan Guzman**[1] Martin McDonell[2], Owen Repp[2], Michael Eff[3], Antonio Ramirez[1]	The Ohio State University[1] Ground Vehicle Systems Center[2] EWI[3]	Ballistic Performance of Friction Stir Welded Armor-Grade Steel
15.40➢16.00	**Elizabeth Hoyos**	TWI Ltd	Towards Hydrogen Storage: FSW-Based Solutions and Challenges	**Ozan Caliskanoglu**[1], Christian Pfeiffer[1], Thomas Weinberger[1], Johannes Österreicher[2], Georg Kunschert[2]	Stirtec GmbH[1] AIT Austrian Institute of Technology[2]	Dissimilar Friction Stir Welding of Ti-6Al-4V and EN AW-7075
16.00➢17.00	**Room B-1** **POSTER SESSION / USER GROUP MEETING / PANEL DISCUSSION**					

13th International Symposium on Friction Stir Welding (V6)

WEDNESDAY 22 May 2024 (Morning)

Room B-1

Session 5 — Plenary II
Chair: Axel Meyer

	Author(s)	Affiliation	Paper title
09.00➢09.20	**Eff, Michael**[1] Rafaeal Giorjao[1], Tim Stotler[1], Dang Cai[2]	EWI[1] Princeton Plasma Physics Laboratory[2]	Friction Stir For Nuclear Fusion: Adapting FSW for Thick Section Dissimilar Copper Joints with Varying Base Material Properties
09.20➢09.40	**Henrik Blicher Schmidt**	HBS Engineering ApS	Development of effective FSW models for training AI
09.40➢10.00	**Michael Hasieber**[2] Markus Weigl[1], Franz Hesse[2], Martin Sennewald[2], Torsten Löhn[2], Jean Pierre Bergmann[2]	Grenzebach Maschinenbau GmbH[1] TU Ilmenau[2]	Experimental investigation of FSW tool wear behaviour using conventional and stationary shoulder
10.00➢10.20	**Jason Jones**[1], Sam Holdsworth[2]	Hybrid Manufacturing Technologies[1] TWI Ltd[2]	Innovative liquid cooling plates manufactured via CoreFlow® friction stir channelling on commercial equipment platforms

Room B-1 / Room B-2

Session 6 — Techniques II (Chair: Yutaka Sato) | **Dissimilar II** (Chair: Elizabeth Hoyos)

	Author(s)	Affiliation	Paper title	Author(s)	Affiliation	Paper title
10.40➢11.00	**Hideki Okada** Yosuke Yoshida	Kawasaki Heavy Industries Ltd	Both Sides Stationary Shoulder Corner Friction Stir Welding	**Jeong-Won Choi**[1] Yoshiaki Morisada[2], Huihong Liu[2], Kohsaku Ushioda[2], Hidetoshi Fujii[2], Kimiaki Nagatsuka[2], Kazuhiro Nakata[2]	Hiroshima University[1] Osaka University[2]	Investigation on optimal temperature in dissimilar Ti/CFRP joint during friction stir welding
11.00➢11.20	**Toshiaki Yasui**	Toyohashi University of Technology	Lap joining between carbon fiber reinforced thermo-plastic and aluminum alloy with porous protrusion structure by friction stirring	**Morgane Geyer**[1] Marie-Noëlle Avettand-Fenoel[2], Vanessa Vidal[1], Farhad Rezai Aria[1], Christine Boher[1]	Institut Clément Ader (ICA), Université de Toulouse[1] Université de.Lille, CNRS, INRAE[2]	Multi-scale effects of the tool shape and length on the interfacial microstructure and the mechanical behaviour of Al2024/Ti-6Al-4V lap friction stir welds
11.20➢11.40	**Louis Lecointre** Lyne St-Georges, Kadiata Ba	UQAC - Université du Québec à Chicoutimi	Study of Friction Stir Welding with Bobbin Tool of aluminum	**Xiankun Zhang** Lei Shi ChuanSong Wu	Institute of Materials Joining, Shandong University	Numerical and experimental study of Ti/Al dissimilar joining by ultrasonic vibration enhanced friction stir welding
11.40➢12.00	**Jonathan Martin**	TWI Ltd	eLOP : Elimination of lack of penetration welding	**Savavana Sundar**[1] Adepu Kumara[1] Krishna Kishore Mugada[2]	National Institute of Technology[1] Sardar Vallabhbhai National Institute of Technology[2]	Feasibility of static shoulder friction stir welding in joining dissimilar metals of Al6061 to Ti6Al4V

13th International Symposium on Friction Stir Welding (V6)

WEDNESDAY 22 May 2024 (Afternoon)

	Room B-1			Room B-2		
Session 7	**Steel II** **Chair: Kenneth Ross**			**Fundamentals** **Chair: Thomas Weinberger**		
	Author(s)	**Affiliation**	**Paper title**	**Author(s)**	**Affiliation**	**Paper title**
13.00➢13.20	**Jungi Chen** Takuya Miura, Kohsaku Ushioda, Hidetoshi Fujii	Joining and Welding Research Institute, Osaka University	Microstructures and tensile properties of friction stir welded high phosphorus weathering steel	**Jan Backlund**[1] Wojciech Osikowicz[1] Henrik Hindsefelt[2]	Hydro Innovation & Technology[1] Combitech[2]	The effect of post weld natural ageing on mechanical properties of 6000-series aluminum alloys
13.20➢13.40	**Antonio Ramirez**[1] Jhoan Guzman[1] Michael McDonell[2], Owen Repp[2], Michael Eff[3]	The Ohio State University[1] Ground Vehicle Systems Center[2], EWI[3]	Characterization of Armor-Grade Steels Friction Stir Welding Joints	**Fabian Vieltorf** Martina E Sigl, Amanda Zens, Michael F Zaeh	Technical University of Munich	Automated Visual Inspection of Friction Stir Welds Using Image Segmentation Algorithms
13.40➢14.00	**Niels Troost** J H den Besten N Mohandas V Popovich	Delft University	Influence of base metal and FSW parameters on hardness and toughness of low carbon steel joints	**Hemant Agiwal** Aishwarya Deshpande Frank E Pfefferkorn	Department of Mechanical Engineering, University of Wisconsin-Madison, USA	Visualization of material flow dynamics during void formation in friction stir welding of aluminum alloys using high speed X-ray imaging
14.00➢14.20	**Austen Shelton** Alvin Strauss	Vanderbilt University	Joint Strength Optimization of Friction Stir Welded, Small Diameter, AISI 304 Stainless Steel Hemispheres without Internal Supports	**Masatoshi Enomoto**	Wise Corporation	Education of Friction Stir Welding in Japan
Session 8	**FSW Tools** **Chair: Yoshiaki Morisada**			**Additive II** **Chair: Michael Eff**		
14.40➢15.00	**Benoit Cognet** Landry Giraud	TRA-C industrie	Influence of tool features and machine piloting on the weld quality	**Christopher Smith** Kenneth Ross, David Garcia Tianhao Wang	Pacific Northwest National Laboratory	Effect of Rod Orientation and Diameter on Additive Friction Surfacing of Steel
15.00➢15.20	**Toni Sprigode**[1] Andreas Gester[1], Guntram Wagner[1], Ulrich Degenhardt[2]	Chemnitz University of Technology[1] QSIL Ingenieurkeramik GmbH[2]	Realization of Friction Stir Welding of Aluminum/Aluminum Joints Using Ceramic Tools	**Hemant Agiwal**[1] Frank Pfefferkorn[1], Aishwarya Deshpande[1] Christian Baumann[2] Stephan Krall[2], Friedrich Bleicher[2]	University of Wisconsin-Madison[1] TU Wien[2]	Dimensionless numbers for predicting process parameter boundaries in friction surfacing
15.20➢15.40	**Michael Hasieber**[1] Hugo Hülsmann[1], Martin Sennewald[1], Torsten Löhn[1], Markus Weigl[2] Jean Pierre Bergmann[1]	Technische Universität Ilmenau[1] Grenzebach Maschinenbau GmbH[2]	The influence of FSW tool wear in relation to the axial force	**Neeraj Mishra** Amber Shrivastava	Indian Institute of Technology Bombay	Microstructure and mechanical characterisation of friction stir metal deposited Inconel 600 superalloy
15.40➢16.00	**Martin Sennewald** Christian Knopf, Michael Hasieber, Jean Pierre Bergmann	Technische Universität Ilmenau	Method of determining tool damage on FSW tools using linear damage accumulation	**Siddharth Tamang** Vishal Mishra	Indian Institute of Technology Kharagpur	Fabrication and Characterization of Aluminium Alloy foam by Friction Stir Processing and Microwave Heating

SOCIAL EVENT

13th International Symposium on Friction Stir Welding (V6)

Thursday 23 May 2024 (Morning)

Room B-1

Session 9 — Plenary III
Chair: Yuri Hovanski

	Author(s)	Affiliation	Paper title
09.00➢09.20	**Laurent Dubourg**	Stirweld	Friction Stir Welding: a game changer for thermal efficiency and cost reduction of liquid cold plates.
09.20➢09.40	**Christian Wansing**	Fooke GmbH	Friction Stir Welding of fuselage panels - Metallic large component manufacturing in the aircraft industry
09.40➢10.00	**Dale Fleck** Russell Steel, Murray Mahoney	Mazak MegaStir	High Speed FSW Discussion will teach how to produce FSW at 3X current traverse speeds detailing test data supporting the jump to 6000 mm/min.
10.00➢10.20	**Yoshiaki Morisada** Danilo Ambrosio, Abhishek Sharma Muneaki Mukuda, Hidetoshi Fujii	Joining and Welding Research Institute, Osaka University	Novel friction stir welding method using a hemispherical-shaped tool tilted toward retreating side

Room B-1 / Room B-2

Session 10 — Techniques III (Room B-1) / **Modelling** (Room B-2)
Chair: Landry Giraud / Chair: Henrik Schmidt

	Author(s)	Affiliation	Paper title	Author(s)	Affiliation	Paper title
10.40➢11.00	**Chris Punshon**[1] Stephen Cater[2] Santonu Ghosh[3]	Cambridge Vacuum Engineering[1] TWI Ltd[2] Element 6[3]	Development of Friction stir welding for the provision of overhead position root passes for fabrication of large, heavy section steel structures	**Ramin Delir**[1] Niklas Sommer[1] Stefan Böhm[1] Mehmet Arda Ehren[2]	University of Kassel[1] Ozyegin University[2]	Implementation of a Bayesian optimization routine to predict the process-structure-interrelationships during dissimilar FSW of aluminum alloys AA5083 to AA7020
11.00➢11.20	**Kunitaka Masaki** Kazuya Kojima Hiroshi Saito, Koji Nezaki	IHI Corporation	Localized melting-induced defects accompanied by abnormal plastic flow in Bobbin-tool FSW of 5083 aluminum alloy	**Elizabeth Hoyos**[1] María Camila Serna[1] Christian Lochmuller[1] Yesid Montoya[1] Jorge Córdoba[1] Leidy Marcela Hoyos[2]	Universidad EIA[1] Universidad EAFIT[2]	A Data-Driven Approach to Predicting Joint Efficiency in FSW of Aluminum Alloys
11.20➢11.40	**Pedro de Sousa Santos**	TWI Ltd	Stationary shoulder-micro friction stir welding of thin aluminium liners for hydrogen tanks	**Krishna Kishore Mugada** Vishwa Menpara	Sardar Vallabhbhai National Institute of Technology	Experimental and numerical investigation of temperature and residual stresses during friction stir additive manufacturing of Al-Mg-Si alloys
11.40➢12.00	**Debanjan Maity** Vikranth Racherla	Indian Institute of Technology , Kharagpur	Feasibility investigation of a new friction processing-based joining technique for Ni-Al dissimilar metal welding	**Hao Su** Ji Chen ChuanSong Wu	Institute of Materials Joining, Shandong University	Numerical modeling of the periodic material flow behavior in friction stir welding

13th International Symposium on Friction Stir Welding (V6)

Thursday 23 May 2024 (Afternoon)

	Room B-1			Room B-2		
Session 11	**FSSW** **Chair: Dave Hofferbert**			**High Temperature** **Chair: Christopher Smith**		
	Author(s)	**Affiliation**	**Paper title**	**Author(s)**	**Affiliation**	**Paper title**
13.00➢13.20	**Matteo Bernardi** Uceu F H Suhuddin Benjamin Klusemann	Helmholtz-Zentrum Hereon	Refill friction stir spot welding, ongoing research and perspectives from Helmholtz Zentrum Hereon	**Dongsheng Li**	AM Energization Corp	Friction Stir Processing of High Temperature High Entropy Alloy
13.20➢13.40	**Masahiro Miyake** Syuhei Yoshikawa Naoki Takeoka, Ryoji Ohashi, Tadahiro Edagawa	Kawasaki Heavy Industries Ltd	Development of robot system for Refill Friction Stir Spot Welding	**Yutaka Sato** Yusuke Kawata Shun Tokita Takeshi Wada Hidemi Kato	Tohoku University	Friction Stir Welding of a Ferritic Stainless Steel to Fe-Ni-Cr Precursor Alloy for Liquid Metal Dealloying
13.40➢14.00	**Yoshikawa Shuhei** Ryoji Kubota Yoshiyuki Shimizu Naoki Takeoka Ryoji Ohashi Shun Tokita Yutaka S. Sato	Kawasaki Heavy Industries, Ltd	Reaction and wear of cemented carbide tool during scrubbing refill friction stir spot welding of aluminum alloy to steel	**Tomoya Nagira**[1] Takahiro Sawaguchi[1] Terumi Nakamura[2] Masakazu Mori[3] Yoshiaki Morisada[4] Hidetoshi Fujii[4]	National Institute for Materials Science[1] The Japan Welding Engineering Society[2] Ryukoku University[3] Osaka University[4]	Friction stir welding of Fe-Mn-Si seismic damping alloy
14.00➢14.20	**Fabian Vieltorf** Amanda Zens Martina Elisabeth Sigl	TU Munich / iwb	Micro-Friction Stir Spot Welding (µFSSW) for Internal Li-Ion Battery Cell Contacts	**Kenneth Ross** David Garcia Tianhao Wang Christopher Smith	Pacific Northwest National Laboratory, Richland, WA, USA	Advances in Friction Stir Processing and Large Scale Additive Friction Surfacing of Steels

	Room B-1		
Session 12	**Plenary IV** **Chairs K Franklin and Jonathan Martin**		
	Author(s)	**Affiliation**	**Paper title**
14.40➢15.10	**Sam Holdsworth**	TWI Ltd	CoreFlow® friction stir channelling of copper for fusion energy applications
15.10➢15.40	**Kevin Colligan**	Concurrent Technologies Corp.	Unit-Area Analysis of Friction Stir Welding Data
15.40➢16.00	**Closing**		

13th International Symposium on Friction Stir Welding (V6)

FRIDAY 29 June 2018 (Morning)

OPTIONAL INDUSTRIAL VISIT

POSTERS

Author(s)	Affiliation	Paper title
Jignesh Nakrani	Indian Institute of Technology Bombay	Prediction of Fatigue Crack Propagation in Aluminium-Steel Dissimilar Joints
Steve Korakan Ales	Papua New Guinea University of Technology	Fatigue strength of Al Interlayer Aluminium to Titanium Friction Stir Lap Welded Joints
Ganga Raju	Axis Cades Aerospace Pvt Ltd	Mechanical properties and weld characteristics of friction stir welding of Nylon 6 and HDPE Plastics by using Induction control heat-assisted tool
Shaokang Guan	Zhengzhou University	Microstructure, mechanical properties and corrosion behavior of friction stir processed MgZnYNd Alloys with HA/β-TCP coating for biomedical application
Yufeng Sun	Zhengzhou University	Microstructure and mechanical properties of submerged friction stir butt welded 1500MPa martensitic steel plates with post-weld heat treatment
Chuanson Wu	Institute of Materials Joining, Shandong University	Multi-phase field simulation of intermetallic compounds formation and growth in dissimilar FSW of Al/Mg alloys
Shengli Li	Institute of Materials Joining, Shandong University	Micromechanical modeling of the creep behavior of friction stir welded reduced activation ferritic/martensitic steel
Lei Shi	Institute of Materials Joining, Shandong University	Enhancing the mechanical properties of medium-thick Ti/Al dissimilar joints by double-side friction stir Z shape butt-lap welding
Harish Kumar Arya	Sant Longowal Institute of Engineering & Technology	A review of cooling assisted (under-water) friction stir welding