



HEADQUARTERS OFFICE
Lungobisagno Istria 15 A
16141 Genoa - Italy

CONTACTS
+39 010 8341 476
iiw@iiwelding.org
www.iiwelding.org

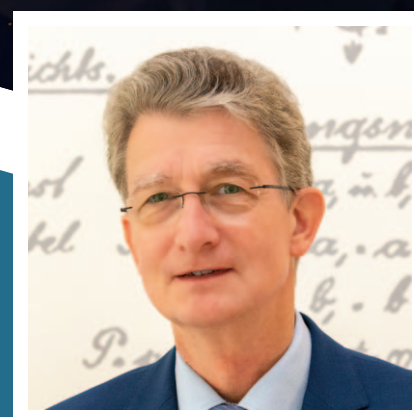


2023

ANNUAL REPORT



MESSAGE FROM THE PRESIDENT



PROF. THOMAS BÖLLINGHAUS
IIW President, Germany

Dear IIW Community,

first of all let me express my gratitude for the confidence and trust that the IIW Member Societies placed on myself when selecting me as your President for our unique and exceptional organization. It is an honor and a pleasure to serve our worldwide network now in this task and to contribute to advance welding and joining as key and value-adding technology in industrialization.

Let me thus take this opportunity to address some major challenges we faced and achievements accomplished during the year 2023.

In the first half of this year, we finalized the development of our new strategy for the years 2023 to 2028. The strategy was approved by the IIW General Assembly in July 2023 in Singapore. Our major yearly event was crowned by more than 800 participants from 47 countries. The success of the event made again evident that our organization stands at the international cutting edge of research, development and applicability of welding and allied processes. Under the vision to be "The leading global welding community linking industry, research and education" and the mission to "Advance welding and joining through a worldwide network", the strategy identifies five Key-objectives:

1. Improve IIW visibility through communication and marketing.
2. Expand the industrial relevance of IIW through research, best practices sharing, development and standardization activities.
3. Enrich the value of IIW to all stakeholders out of volunteers, member societies and industry.
4. Improve and expand our ETQ&C system to meet the needs of industry and IIW members.
5. Improve the organizational and management structure to ensure it meets IIW stakeholders expanding needs.

Starting within Key-objective 1, after the Annual Assembly in Singapore the new website of IIW was launched, providing now a really interactive as well as an easy-to-access and to-use platform for the exchange of knowledge, documents, announcements and administrative matters. As referred to Key objective 2, the TMB already started to focus especially on research and best practices for the industry. In addition, access to the latest research results has further been improved via our flagship journal *Welding in the World*, with over 200 papers published. Let me thank our network of volunteers for their outstanding results. Regarding Key-objectives 3 and 4, we will more and more approaching pro-actively new member societies, finding easier ways for them to become part of and benefit from IIW, especially in those regions of the globe with emerging industries. It can only be seen as a significant drawback in the internationalization of IIW, if we have to unfortunately suspend services to a member society, as we are forced by legal constraints. Let me emphasize that IIW is not a political platform and thus, we intensively hope that we can integrate the Russian member societies back again in our community, as soon as the situation improves. However, in the last year IIW has already received several declarations of interest to join us and thus, hopefully the number of member societies will increase in the upcoming years. Concerning Key- objective 5 the IIW Board of Directors is working continuously to improve the management structure even further towards a lean, flexible and effective governance of IIW. Some improvements to the IIW Constitution have already been elaborated and will be presented for approval by the General Assembly. It can only be emphasized, that thanks to the diligent control and careful measures taken by the secretariat, the IIW Treasurer and the Board of Directors the financial situation of IIW may be considered stable and satisfactory in 2023, despite worldwide increasing inflation and crises.

In 2023, we opened the IIW Charity Fund for donations from member societies or individuals. Let me express our sincere gratitude to donors for their significant support.

The coming year 2024 will not only be an exciting year for me, still remembering my first presentation in Commission IX-A resulting in my first publication, of course in *Welding in the World*, 30 years ago. Thus, be assured that 2024 will also be the year when the IIW BoD will even more concentrate on fostering our scientific and technical offspring, attracting especially young professionals to pursue a career in our exciting and inspiring disciplines.

With this message I would like to express my sincere thanks to the IIW CEO Luca Costa and the chairs of the two standing Working Groups of the IIW Board of Directors, Doug Luciani (Working Group Governance) and Stephan Egerland (Working Group Finance, Audits and Risks) for their wholehearted work and immense support to the organization.

Last, but not least, I wish to cordially thank you all for your voluntary contributions to our association, either by the exchange among the experts in the commissions in our knowledge hub of the Technical Management Board, or by your contribution to the IIW education, qualification, training and certification system in the network of ANBs, ANBCCs and ATBs of the International Authorization Board, or by your personal engagement in the administrative working groups. This is the power keeping the engine of IIW running and operating at considerable speed to let IIW lead the global welding community. This gives the greatest motivation and strength to the management of IIW, which I have the honor and the pleasure to lead.

Looking forward to seeing and working with you in the coming years – respectfully, Thomas Böllinghaus

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OUR PEOPLE

IIW BOARD OF DIRECTORS 2023/2024



Prof. Thomas Böllinghaus
(Germany)
President



Dr. Stephan Egerland
(Austria)
Treasurer



Mr. John Gayler
(USA)



Prof. Srinivasan Ramachandran Iyer
(India)
Vice-President



Dr. Fernando Manas
(Spain)
IAB Chair



Prof. Paul Kah
(Cameroon)



Mr. Robert Shaw
(USA)
Vice-President



Prof. Xiaoyan Li
(China)
TMB Chair



Ms. Georgia Kolyva
(Greece)



Mr. Douglas Luciani
(Canada)
Past President



Ms. Susanne Baumgartner
(Austria)



Dr. Zheng Sun
(Singapore)



Dr. Luca Costa
(Italy)
CEO



Prof. Yevgenia Chvertko
(Ukraine)



Prof. Tomoyuki Ueyama
(Japan)



Mr. Jorg Vogelsang
(Germany)

MANAGING THE ORGANISATION IIW Secretariats

IIW has benefited from a prestigious history of secretariat services provided by Member Societies, from the early parallel roles of The Welding Institute UK as Administrative Secretariat and Institut de Soudure France as Technical Secretariat to 1995 when Institut de Soudure took on the combined role of General Secretariat. Since 2020 the General Secretariat role has been performed by Istituto Italiano della Saldatura in Genoa, Italy.

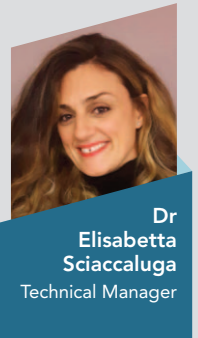
Also in 2020, the service agreement for the management of the IIW International Authorisation Board (IAB) was renewed with the European Welding Federation (EWF) with the agreement updated to include services aligned with the needs of IIW and IAB members for the following five years.

The IIW is grateful to the current and past secretariats for their outstanding work performed over more than 70 years of growth of the organisation, coupling continuity with the past with renewed energy in all enterprises. Personnel at the current secretariats aim to deliver world class service to the IIW community and support the organisation and its members as they face current and future challenges.

IIW SECRETARIAT



Dr. Luca Costa
Chief Executive Officer



Dr. Elisabetta Sciacaluga
Technical Manager



Mrs. Erdmuthe Raufelder
Editorial Office Manager



Dr. Rosario Russo
Administrative and Communication Specialist



Mr. Andrew Davis
Standards Officer



Dr. Francesco De Fino
IT Assistant

IAB MANAGEMENT TEAM



Eng. Rute Ferraz
IAB Chief Executive



Eng. Pedro Catarino
IAB Technical Officer



Eng. Tobias Rosado
Deputy IAB System Manager



Dr. Eurico Assunção
IAB Deputy Chief Executive



Eng. Italo Fernandes
IAB System Manager

TREASURE'S REPORT 2022/23



DR STEPHAN EGERLAND
Treasurer, Austria

For the first time I am allowed to present this IIW Treasurer Report after taking over the position of Treasurer of the IIW from my honourable predecessor, current IIW President Prof. Thomas Böllinghaus. The reader may wonder why this report partly spreads over two financial years, i.e., reflecting the results achieved in 2022, but also discussing items explicitly taking place in 2023. However, we found it meaningful to provide insight to both due to facts and figures strongly interwoven in a sensitive manner. As already announced in the previous Treasurers Report, the IIW 2022 financial situation was highly affected by drastic increases in global inflation rates. However, the Association could nonetheless finish the financial year 2022 positively with a profit of € 974.00. The contract collectively agreed with the Italian Institute of Welding (IIS) primarily involves the annual inflation rate to calculate the expenses for the IIW Secretariat and its superb services. Mainly due to the passionate initiative taken by former IIW President Mr Sorin Keller, negotiations with the IIS Management could lead to a reduction of the total inflation rate actually to allocate for the services provided by the IIW Secretariat. As reported by the previous treasurer, all efforts could thus finally lead to a balanced financial situation of the IIW in 2022.

In 2023, IIW had the pleasure to have its 76th IIW Annual Assembly and International Conference on Welding and Joining, hosted by the Singapore Welding Society (SWS). After two years of limitations in travelling abroad this pure face-to-face meeting was highly successful with more than 800 registered participants joining both events the Technical Commission Sessions and the International Conference. Almost 130 IIW Young Professionals (YPs) made their way to Singapore showing how important and successful the efforts devoted by the Association has become since initiating this program. From a particular treasurer's specific viewpoint, one might consider the reduced fees allotted to YPs to join IIW Annual Assemblies "negatively" affecting the total income. However, our Singaporean friends pleasantly showed that both is possible, a considerable surplus positively also impacting the fee to transmit to the IIW and having a high number of YPs participating in an IIW Annual Assembly. Almost € 110.000 could thus be received from the event organisers and IIW is grateful to SWS for having passionate arranged such an outstanding IIW Annual Assembly and International Conference, thereby adding profound value not only to IIWs global recognition but also to its finances. One further positive aspect shall not be forgotten to be mentioned. The IIW Charity Fund could receive considerable donations both from IIW individual- but also corporate members. Based on a decision of the IIW Board of Directors, the fund, well grown during 2023, consequently allowed IIW to have our Ukrainian friends' membership fees be taken over and to invest in technical equipment to have Ukrainian Delegates joining the IIW Annual Assembly on-line in 2023. From the current perspective, and apart from the fact that the final numbers are not available yet, IIW will safely finish the running financial year 2023 with a positive profit and thus similar to 2022. Finally, please let me inform you that a Task Group (TG-FEE) was formed under IIWs Working Group "Finance, Audit, and Risk", to review and possibly revise the current approach for the calculation of IIW Membership Fees. TG-Fee has already started its work and results will be reported to the IIW Members in due course. As the Association's treasurer I shall hence thank all of you for being the bedrock the IIW is built upon. It is your financial contributions and your confidence that make the organisation work so successful. Therefore, my wholehearted personal thanks to you, the unique community of IIW members, supporters, and friends.

IIW ACCOUNTS 2022

INCOME STATEMENT 2022	
ITEM	REALISED
INCOME	
Membership fees	461.241
Fees from IIW events (A.A.+ Congress)	108.083
<i>Welding in the World</i>	57.868
Royalties on IIW Recommended Practices and PS	0
Royalties on IAMQS	0
ISO Standards	0
Other incomes	27.474
Interest from bank accounts	-
TOTAL	654.666
EXPENDITURE	
Secretariat	502.560
Travelling expenses (for IIW Events since 2022)	54.830
Direct costs for meetings and prizes	1.548
Office supplies (included computer maintenance until 2021)	6.842
Postage and telephone	27
Promotion, communication & marketing	29.431
Software (hosting and maintenance)	1.605
Audit fees and legal fees	9.100
Bank charges	1.898
Straight-line method of depreciation	8.247
Insurance	3.119
Registry Tax (formerly business tax)	963
Other charges	16.006
Extraordinary costs: transfer IIW to Italy	7.171
TOTAL	643.346
OPERATING RESULT	11.320
BAD DEBTS INVENTORY	
Bad debts recovered	-
Allocation to fund for doubtful account (membership fees)	-7.500
Provision for doubtful account (VAT recovery)	-
Recorded Irrecoverable debt	-13.237
Use of fund for doubtful accounts (membership fees)	13.237
TOTAL BED EBITs	-7.500
WELDING CHARITY FOND	
Allocation from IIW	0
Donations	0
Expenditures	-13.780
Use of IIW Charity fund	13.780
TOTAL IIW CHARITY FOUND	0
NET RESULT BEFORE TAX	3.820
Income tax	-2.846
RESULT AFTER TAX	974

MESSAGE FROM THE CHAIR OF THE TECHNICAL MANAGEMENT BOARD



PROF. XIAOYAN LI
Chairman of the Technical Management Board of the IIW, China

Following a three-year interruption caused by the challenges brought about by the worldwide pandemic, the Singapore Welding Society (SWS) has successfully organized and executed a wonderful fully face-to-face IIW annual assembly, the 76th IIW Annual Assembly, for all our member societies and the unique global welding community. As the new Chair of the Technical Management Board (TMB) of the IIW, I would like to seize this opportunity to express my gratitude for the extensive efforts put forth by SWS. Through their uncountable hard works, the host member society managed to create a truly remarkable event, reminiscent of the successful assembly held in 2009. This enables the IIW technical members from around the world to have a week-long in-depth discussions and exchange in 18 technical commissions and young professional events as well as the entitled "Advances in Welding, Joining and Additive Manufacturing" international conference. The 76th AA focused on the present status and future prospects of welding science and technology as well as their industrial applications, garnering immense appreciation from the delegates, experts, observers and many other individuals within the welding community. The participation of a significant number of attendees in both the annual assembly and the international conference serves as concrete evidence of its resounding success. Over the course of one week, a multitude of presentations and discussions took place among the 18 technical commissions, the young professional event and the associated international conference. I would like to express my sincere gratitude to Mr. Bob Shaw, the Chair of WG-TCOM, as well as the commission Chairs and sub-commission Chairs. Their dedication and hard work in managing these individual commissions and organizing commission meetings played a vital role in the success of both the individual commissions and the overall AA as well. I would also like to extend a special thanks to Dr. Stephan Egerland, the previous TMB Chair, who has impeccably managed the TMB for many years, including the 76th AA technical matters. His personal success is intertwined with the success of the technical activities during the last AA. It is a pleasure to have him as he continues serve the IIW as the Treasurer and the Chair of WG-FAR. Additionally, I am also delighted to welcome Dr. Ghazal Moeini to join us as a new voting member of the TMB representing the WG-YP. I sincerely thank all other members of the TMB for their excellent service and great contributions to the IIW. As the Chair, I eagerly anticipate the opportunity to service all the members and working closely together for the success of the TMB in the coming years. A special event, with the focus on the AI manufacturing in welding, was organized and co-chaired by Prof. Yuming Zhang and Dr. Stephan Egerland for the first time at the 76th IIW Annual Assembly, which has drawn significant interest. A plethora of esteemed speakers shared the up-to-date researches in this realm and contributed more than 20 noteworthy papers which were recommended to the IIW's official journal, the Welding in the World, for consideration of publication. It is my earnest aspiration that the promising start of this event paves the way for even greater accomplishments in the forthcoming Annual Assemblies. During the 76th AA, the new IIW Strategic Plan and Operational Plan for 2023 to 2028 were approved, and the relative TMB Operational Plan has also been approved by the Board of Directors of the IIW. It is anticipated that the implementation of the TMB Operational Plan in the coming years will contribute towards the establishment of more technical best practices, thus enabling the IIW to fulfill its defined missions effectively. Reflecting upon the delightful memories of the 76th IIW AA, I am truly impressed by the admirable strides made in the preparations for the 77th IIW AA by the Greek Welding Society. I earnestly anticipate your dedication and contributions towards the upcoming AA, and eagerly look forward to meeting you all in Greece for another splendid IIW Annual Assembly.

SPOTLIGHT ON NEW CHAIRS

Prof. Dr. Ing. Jolanta Janczak-Rusch is a group leader at Empa, Swiss Federal Laboratories for Materials Science and Technology in Dübendorf (Switzerland), where she supervises a team dedicated to the advanced joining technologies. She obtained her Ph.D. in Materials Technology at the Technical University Dortmund in 1994. After an extensive research period on interfaces in composite materials at EPFL and Empa Thun and in collaboration with many international partners, she habilitated in this field at the Warsaw University of Technology in 2008.

In recognition of her academic achievements, she was nominated in 2014 by the President of the Republic of Poland as Titular Professor.

Jolanta's main research interests are centered around micro- and nanojoining technologies, joining with nanomaterials, reactive joining, nanomultilayers and nanopastes, the development of joining concepts for industry and hybrid joining processes. Her research results can be found in over 100 frequently cited papers. In addition to her research activities, she works very closely with industry on the product oriented solutions.

She is a board Member of the Swiss Welding Society (SVS) as well as a member of the SVS Scientific-Technical Advisory Board.



PROF. DR ING JOLANTA JANCZAK-RUSCH
Elected Chair of Commission VII

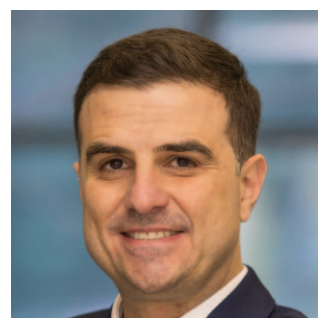
Univ.-Prof. Dr.-Ing. Sergio Amancio is a full professor for aviation materials and manufacturing techniques at Graz University of Technology - TU Graz (Austria). He is a deputy head of the Institute of Materials Science, Joining and Forming and chair of the 'Austrian Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology (BMK) Endowed Professorship for Aviation'.

Furthermore, Sergio Amancio is an adjunct professor in the Welding Engineering Program at Ohio State University (USA) since 2020.

The focus of his work has been on the correlation between processing parameters, microstructure and material properties aiming at developing, understanding and optimizing joining and additive manufacturing techniques for lightweight engineering structures. Before joining TU Graz, he was a Helmholtz-Young Investigator group leader at Helmholtz-Zentrum Geesthacht (Germany) and an Assistant Professor for Joining Technology at the Institute of Polymer Composites of Hamburg University of Technology - TU Hamburg (Germany).

Prof. Amancio has developed and patented new manufacturing techniques for polymer-metal hybrid structures. He has been awarded 22 patents, co-published over 275 technical publications and co-edited 3 technical books, including the first technical book on joining technology of metal-polymer structures in 2018.

Prof. Amancio-Filho is a recipient of national and international awards, including the 'Granjon Prize 2009' of the International Institute of Welding, the 'German High Tech Champions 2013' of the German Federal Ministry of Education and Research (BMBF), the 'Georg-Sachs Prize 2014' and the 'DGM Prize 2022' of the German Society for Materials Science (DGM). Since 2009, Prof. Amancio is an Austrian expert and delegate member at different IIW commissions and has served as a technical expert in large number of scientific and technical committees in Europe and Americas.



PROF. DR ING SERGIO AMANCIO
Elected Chair of Commission XVI

SPOTLIGHT ON NEW CHAIRS



**DR PATRICK W.
HOCHANADEL**
*Elected Chair of
Commission IV*

Patrick W. Hochanadel, Ph.D. of Los Alamos National Laboratory (LANL) received BS, MS and PhD degrees in Metallurgical and Materials Engineering from the Colorado School of Mines under the guidance of Professor Glen Edwards. He began working at LANL in 1997 as a Staff Scientist. Dr. Hochanadel has co-authored numerous publications and is the Chapter Chair for the 10th Edition of the AWS Welding Handbook for both Electron Beam Welding and Laser Beam Welding, and was an author for the ASM Metals Handbook, Volume 6A in both Electron Beam Welding and Laser Beam Welding. He has had several presentations to AWS, IIW, TMS, ASM International and the North American Die Casting Association. Dr. Hochanadel has been involved in the American Welding Society (AWS) for more than 30 years. He was the Chair and is the current Vice-Chair of C7, High Energy Beam Welding and Cutting, Chair of C7B, the subcommittee for Electron Beam Welding, and the Chair of C7D, the subcommittee for Laser Hybrid Welding. He is the current Chair of C7C, Laser Beam Welding. He is a long-time member of the AWS Technical Papers Committee. In 2022, he was elected Fellow of the American Welding Society. He the McKay-Helm Award (AWS), International Meritorious Certificate Award Recipient (AWS), the R.D. Thomas Award (AWS), and the Arthur Smith Award from IIW. Dr. Hochanadel is a reviewer for the Welding Research Supplement in the Welding Journal and a member of the Editorial Board as an Associate Editor for the IIW Journal, Welding in the World and has served as US Delegate and Secretary of Commission IV for several years.



**PROF. DR ING
HEE SEOCK
CHANG**
*Elected Chair of
Commission III*

Technical Advisor, Ph.D., Cylindrical Cell Technology Department, LG Energy Solution (Republic of Korea). Mr Hee Seock Chang is an expert at "In-process Monitoring and Control of RSW(Resistance Spot Welding) Processes"; Development of servo-actuated microspot welder (on commercial market, patent 563415 & 585372); Development of stand-alone servo gun controller (compatible to any robot controller & RSW heat controller, on commercial market, patent 499626); Development of intelligent RSW heat controller for in-process nugget size estimation; Development of in-process monitoring technique for micro RSW (patent 644925).



IIW WORKING UNITS



C-I / ADDITIVE MANUFACTURING, SURFACING, AND THERMAL CUTTING

Mr Ing. Doug Kautz

Commission I had an excellent year with great participation at our meetings, both independent as C-I and as part of various intermediate meetings with other commissions. These meetings included a special session on additive manufacturing preceding our general meeting at the Annual Assembly in Singapore, our typical joint meeting at the Annual Assembly with Commissions IV and XII and a very successful two-day meeting in Mundertsbach, Germany hosted by EWM and DVS with Commissions IV and XII. More and more as the Additive Manufacturing industry matures, the equipment sets allow for fabrication of much larger and more complex components. While this is true, there is still a lot of work on smaller AM products for more niche applications. The movement towards standardization of these processes is moving along rapidly with support from many members of our Commission and using data from many of the Commissions of IIW. Our Commission has now added a vice-chair and has chairs for each of the three sub-commissions. We are happy that over the last several years that we have also reignited high quality technical papers in our other areas aside from AM. Several papers have been presented and moved on to Welding in the World for both thermal cutting and surfacing applications. During the Annual Assembly in Greece this year, I plan to address vice-chairs for each of the sub-commissions, hopefully, finding young professionals in these areas with a desire to become part of our leadership.



C-II / ARC WELDING AND FILLER METALS

Dr Zhuyao Zhang

In 2023, Commission II held the intermediate meeting jointly with C-IX in Munich, and the 76th Annual Assembly in Singapore. A total of 45 technical papers were presented and discussed. Among these, 15 were recommended for peer review of Welding in the World. Based on a 6-yr average covering 2017–2022, C-II keeps being a very well performing commission with a 5th rank position among all 18 IIW Technical Commissions. C-II's contributions take about 10% of the papers published. For year 2024, the intermediate meeting is scheduled for 12 – 14 March in Korea. Meeting will be a face-to-face only meeting and will be held jointly with C-IX's intermediate meeting. Following that will be the Annual Assembly in Rhodes Island, Greece in July. During the last three years, the ISO Technical Report: Welding – Guidance on specification and measurement of the ferrite in stainless steel weld metals was discussed, reviewed and updated. The document is at the final stage being issued as a formal ISO Technical Report. Apart from the intermediate meetings jointly with C-IX that greatly benefited the members of both commissions of whom most have interests for topics and activities of both C-II and C-IX. In the past Annual Assemblies, joint sessions between C-II and C-VIII have been held in which latest topics of health, safety and environment that connected with arc welding and filler metals were presented and discussed. At the last Annual Assembly in Singapore, July 2023, Dr Susanne Baumgartner was elected as Vice-Chair of C-II.



C-III / RESISTANCE WELDING, SOLID STATE WELDING AND ALLIED JOINING PROCESS

Prof. Dr Ing. Hee Seock Chang

Commission III serves as a platform for over 300 international experts to exchange knowledge on resistance welding, solid state welding, and related joining processes. In the 1990s, significant efforts were directed towards developing standards for resistance spot welding, resulting in numerous ISO standards that provided crucial guidance, particularly for the automotive sector. The introduction of Friction Stir Welding (FSW) in the late 1990s revolutionized solid-state joining processes, captivating researchers worldwide with its unique thermomechanical conditions and enticing various industries to support research on joint formation mechanisms and microstructural evolution. FSW became a prominent topic for scientific and technical contributions to Commission III and Welding in the World publications. The accumulation of FSW-related research spurred the formation of a standardization group, leading to the creation of the first dedicated ISO standard for FSW in 2011 (ISO 25239:2011). This standard, reviewed in 2020, significantly aids FSW-based industrial fabrication and is widely utilized by small and medium enterprises globally. The market saw the development and introduction of several process variants, expanding interest in solid-state material processing. Resistance welding, particularly resistance spot welding, faced increased demand for solutions related to Al and Al-based dissimilar joints in body-in-white production. Creative solutions emerged in both process control and hardware to address this demand. With the emergence of advanced high strength steels (AHSS), attention in the resistance spot welding community shifted towards issues of liquid metal embrittlement (LME). Commission III has responded by developing an impressive portfolio of documents focused on understanding and mitigating LME in recent years.

C-IV / POWER BEAM PROCESSES

Dr Patrick W. Hochanadel

In 2023, Commission IV participated in both the Intermediate Meeting, a Joint Meeting between Commissions I, IV, and XII in Germany as well as the 76th Annual Assembly in Singapore. More than twenty presentations were given at the Intermediate Meeting, 6 of which were related to Commission IV activities. At the Annual Assembly, 40 presentations were given during the three-day meeting of Commission IV, which included the full-day joint session with Commissions I, IV, and XII. During the Annual Assembly, Dr. Patrick Hochanadel was elected as Chair of Commission IV, with the Vice-Chair election will be part of the 77th Annual Assembly in Greece. In the future, continued advancement the power beam processes will be emphasized, such as in-situ and ex-situ process monitoring and evaluation, novel laser welding processes (blue and green laser), and re-targeting laser-arc hybrid welding (no presentations given in the Annual Assembly). An emphasis on the power beam processes in additive manufacturing will continue. The most intriguing topic over the past two years was the topic of copper welding using blue lasers at power greater than 1 kilowatt. Handheld electron beam welding for space welding was presented by a remote Ukrainian attendee. Laser welding in vacuum is a promising technology to be emphasized.



C-V / NDT AND QUALITY ASSURANCE OF WELDED PRODUCTS

Prof. Dr Marc Kreutzbruck

Commission V oversees international standardization activities related to non-destructive testing (NDT) and evaluation of welded structures, with specialist groups focusing on radiographic, ultrasonic, electric/magnetic/optical, and reliability aspects. NDT plays a crucial role in ensuring the integrity of components, especially in detecting material defects and assessing mechanical conditions without causing damage. The commission emphasizes adapting to advancements in NDT techniques, with a current focus on preparing a new edition of the Ultrasonic Handbook for austenitic materials. The transition from film-based radiography to digital detectors, led by sub-commission CV-A, highlights the importance of standardization in technological shifts. The trend in NDT is moving towards 3D imaging inspection, supported by methods like total focusing method (TFM), with Commission V experts contributing to ISO standards in this area. Additionally, the commission addresses structural health monitoring (SHM) and is involved in revising standards like ISO 18211 for Guided Wave Testing.



C-VI / TERMINOLOGY

Mr Jérôme Dietsch

Tremendous efforts were devoted throughout 2023 to push forward the three main topics Commission VI is currently working on, i.e., laser welding, plastics joining and thermal cutting. Indeed, in addition to the significant progress made during the Annual Assembly, thanks to the very accurate contribution from renowned experts in the different fields, several web-meetings were regularly organised to achieve full sets of terms and definitions suitable for what is the principal output of Commission VI to the global welding community, terminology standards. The work is carried out in a close collaboration with ISO, the International Organisation for Standardization; this is notably visible with the involvement of the chair, Mr. Jérôme Dietsch (France), who also chairs the IIW Working Group on Standardisation (WG-STAND) and the ISO subcommittee on Representation and Terms in Welding and Allied Processes (ISO/TC 44/SC 7). Many Commission VI Members also have commitments in all three groups, as for example Dr. Glenn Ziegenfuss (USA), who is currently the vice-chair of Commission VI, or the project leaders of the current projects. Commission VI is also collaborating with members of other IIW Commissions, according to the topics under discussion. The main objectives for the forthcoming years are the finalisation of the three above-mentioned subjects, the revision of three already published standards (dealing with general terms for welding and allied processes, welding processes and arc welding) and the development of new deliverables on subject not yet covered.





C-VII / MICROJOINING AND NANOJOINING

Prof. Dr Ing Jolanta Janczak-Rusch

Commission VII continued its efforts to strengthen the foundations of the relatively new but rapidly growing microjoining and nanojoining technology. After three years of very dedicated work, Prof. Guisheng Zou (China) stepped down as a chair and handed over the leadership of the commission to the newly elected team: Prof. Dr.-Ing. Jolanta Janczak-Rusch (chair) from Empa (Switzerland) and Prof. Tomokazu Sano (vice-chair) from the University of Osaka (Japan), who aimed to build on the solid foundation laid by the predecessors. The excellent presentations during the annual meeting highlighted the advancements in the areas of nanopaste-based joining techniques, (femtosecond) laser-assisted micro/nano joining and joining with reactive nanofoils. Furthermore, they provided insights into the development of characterization methods for material joints at micro- and nanoscale. The joint session with C-XVII (Brazing, Soldering and Diffusion Bonding) demonstrated the complementarities and synergies between "traditional" joining techniques - such as brazing, soldering or diffusion bonding - and joining processes based on nanomaterials (nanojoining processes), underlining the importance of collaboration between experts from the different fields. The further strengthening of the exchange with other commissions as well as the expansion of cooperation with industrial partners from various sectors will remain at the forefront of the commissions' activities in the coming years. While continuously reviewing the general technology trends in nanojoining techniques and heterogonous integration for micro- and nano-scale devices, the C-VII will work intensively on developing first best practices in microjoining and nanojoining. This should ensure the industrial transfer and a wide use of these innovative joining processes in the future.

C-VIII / HEALTH, SAFETY AND ENVIRONMENT

Mr David Werba



Over the past year, the work of C-VIII included discussions on the proliferation of handheld laser welding in the worldwide welding industry. This underlines the need for concise welding safety precautions for this new emerging technology. Specifically, the need for appropriate Personal Protective Equipment (PPE) for the handheld laser welding technology is needed (e.g.; Handheld Laser Welding Helmets, Laser Safety Officer (LSO) requirements and training, and Laser Controlled Area (LCA) requirements). At the 2023 Annual Assembly, the characterization and evaluation of welding fumes, the development of a measuring method of welding fume emission, and the effectivity of nano-particle extraction using fume extractor torches with little to no effect on the welding arc were some specific topics of interest. This continued focus on welding fume, highlights the need for further welding fume related discovery and research and collaboration with C-II, Arc Welding and Filler Metals. As IIW C-VIII is an interdisciplinary network that regularly reviews, exchanges and shares knowledge and general trends in international and national regulations, laws, and rules, and develops best practices regarding Health, Safety, and the Environment with respect to welding, these previous listed emerging technologies will be the most explored topics over the next five years. Currently, C-VIII is stable in the Chair and Vice-Chair positions, but is always looking for additional participants, experts, and future leaders.

C-IX / BEHAVIOUR OF METALS SUBJECTED TO WELDING

Dr Hee Jin Kim



Commission IX consists of four sub-Commissions that covers the most of metallic materials being welded and arranges two technical meetings each year: intermediate meeting and AA meeting. In 2023, the intermediate meeting was held jointly with C-II at TUM and was crowded with 42 attendees and 21 presentations. In the AA meeting in Singapore, 35 papers were presented and 14 papers were recommended to WitW. There was a variety of topics, the most innovative ones being characteristics of acicular ferrite, additive manufactured duplex stainless steel and dissimilar Al-Cu joints. In 2023 AA, disbandment of IX-C, Creep and heat resistant welds, was resolved considering the decreased interest of industrial sectors. Instead, a new sub-Commission, named IX-AM (Metallurgy of Additive Manufacturing), was created and designed to highlight the metallurgical aspect in AM technology for the practical applications of AM products. In this context, this commission will get into the area of the standardization of AM procedures collaborating with C-I, -II and C-V. This commission continues to expand the weldability issues of the dissimilar joints of nonferrous alloys considering the battery industries' demand for the electric vehicles. Collaboration with C-III will be needed in the coming years for the full benefits out from the process aspect of dissimilar joints.

C-X / STRUCTURAL PERFORMANCES OF WELDED JOINTS - FRACTURE AVOIDANCE

Prof. Mitsuru Ohata



The annual assembly highlighted 7-categories of technical presentation; S1: Advancement of FFS – Brittle fracture, S2: Advancement of FFS – Ductile fracture, S3: Fracture toughness evaluation, S4: Environment induced fracture, S5: Thermal buckling, S6: Advancement of FFS –Welding residual stress, S7: Fracture assessment at cryogenic temperature. These activities were performed in accordance with the revised draft idea of "New Operation Plan" of C-X; 1) Advancement of the current C-X FFS standard including additional new supplemental items including "Small specimen test techniques for welds" and "Environment (hydrogen) induced fracture assessment for weld components", 2) Development of new assessment tools together with an expansion of FFS target and new, challenging, innovative research items, such as data driven assessment and FEA-based digital twin. A new WG named "Fracture toughness test at cryogenic temperature" proposed by Dr. Jung Goo Park was approved in 76th Annual Assembly and launched activities with a call for participants. Next plans are taking a new initiative in AM (additive manufacturing) research by making a working group (or sub-commission) in C-X, and collaborating with other commissions relevant to hydrogen induced fracture assessment of steel structures.

C-XI / PRESSURE VESSELS, BOILERS AND PIPELINES

Prof. SuJun WU



C-XI has a very successful year of 07/2022-07/2023, with the 76th IIW AA and two successful Intermediate Meetings:

During the SC-XI-E Intermediate Meeting held at Lincoln Electric in Germany in April, several topics were discussed on various matters. Representatives from pipeline owners, laying companies, class societies, equipment/consumable/materials suppliers, and RTOs and consultancy firms attended. The meeting ended by a live demonstrations of welding techniques and equipment. During the C-XI Intermediate Meeting held at TWI Ltd. in the UK in May, experts and professionals in the field of safety, reliability, structural integrity management, and NDT of welds in Hydrogen and Ammonia environment attended. Possible standards for welds for hydrogen service were discussed. During the 76th IIW AA held in Singapore in July, C-XI has had 3 afternoon sessions with one session covering various topics including discussion on setup of sub-commissions and C-XI's aim & scope and future activities. Two technical sessions covered "Performance of Welds for Hydrogen Services" and "Welding/Inspections/Performance Assessment for PVBPs" respectively, with technical presentations and panel discussions.

C-XI has been planning to hold several Intermediate Meetings this year. In addition to last year's intermediate meeting topics, C-XI will organize the following intermediate meetings: "High temperature boilers and pipelines (scheduled for April)"; "Welding / joining and inspection of nonmetallic pipes / tubes (to be held on 22-23 March)"; and "Welding/inspection facilities and technologies in harsh environments (scheduled for April)". Each of the three new sessions together with the organizing chairs will be voted as the corresponding Sub-commissions and chairs in the 77th IIW AA in Greece.

C-XI is always open and ready to jointly work with other commissions on relevant topics.

C-XII / ARC WELDING PROCESSES AND PRODUCTION SYSTEMS

Prof. Satoru Asai



Commission XII highlighted the research and development of arc welding process to various fabrication fields based on fundamental issues of arc physics and the production systems for various industry sectors to realize low cost production with high quality. Many excellent papers presented at Commission XII were spread worldwide as a good practice and published in Welding in the World. The recent notable topics in Commission XII include intelligent robotic and autonomous welding system with visual sensors using Artificial Intelligence, in-process monitoring system for weld defects, and the research on 3D modeling and numerical simulation for molten pool behavior and droplet transfer phenomenon for wire arc additive manufacturing. As future plans, Artificial Intelligence and Wire Arc Additive Manufacturing technologies for the intelligent welding will be focused in order to contribute the realization of innovative production. As a collaboration with other commissions, Commission XII has held a joint meeting of C-I and C-IV for technical exchange of the latest information on additive manufacturing and welding processes every year in IIW annual assembly and Intermediate meeting.



C-XIII / FATIGUE OF WELDED COMPONENTS AND STRUCTURES

Prof. Kenneth MacDonald

Commission XIII, established in 1951, focuses on addressing challenges related to the structural integrity of welded components and structures under cyclic loading. The commission comprises several working groups dedicated to fatigue testing, stress analysis, and mitigating the effects of weld imperfections on fatigue strength, among other areas. It collaborates with industrial partners and research institutions globally to raise awareness of fatigue issues and develop assessment methods and innovative technologies. Industries benefiting from its work span aerospace, shipbuilding, infrastructure, automotive, and more. Commission XIII has published numerous guidelines highly relevant to the welding community, including recommendations for fatigue design and assessment, methods for improving fatigue strength, and best practices for statistical analysis of fatigue results. Currently, it is developing new guidelines for challenging design and life extension scenarios, such as retrofitting engineering for fatigue-damaged steel bridge structures. Commission XIII meetings are extensive, often lasting four days due to the presentation of high-quality papers and documents. It has been a leading contributor to the *Welding in the World* journal and has recommended numerous research and engineering papers for publication.



C-XIV / EDUCATION AND TRAINING

Mr Carl Peters

Commission XIV, Education and Training had an exciting year preparing its members for emerging challenges by learning about new technologies and new training methods. Digital training, including the use of VR and AR, is changing the education landscape. In addition, intelligent manufacturing is evolving quickly so we are learning how to apply it to welding. C-XIV has been active in bringing new teaching methods to IIW that address these issues. Since these powerful ideas do not reside in a single commission, an effective way to learn about them is by sharing best practices and innovations with other commissions and organizations. A highlight of each annual assembly is a presentation by another commission chair addressing new innovations and their applications. We also feature presentations by leading educational organizations from around the globe. Our work has only begun so in the upcoming years C-XIV will focus on education, training, qualification, and certification best practices, emerging intelligent manufacturing applications and the continual developments in digital learning. Our efforts will also address attracting future generations in science, technology, and industry through our newly formed sub commission dedicated to this issue which will be chaired by a female supported by a Young Professional as a vice chair.



C-XV / DESIGN, ANALYSIS, AND FABRICATION OF WELDED STRUCTURES

Dr Eng. Stefano Botta

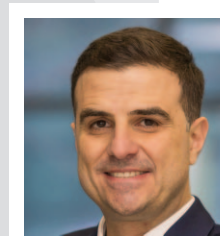
Commission XV focuses on the design, analysis, and fabrication of welded structures, encompassing various materials such as structural steel, stainless steel, and aluminum. The commission is organized into six sub-commissions covering different technical aspects and applications of welded structures. These include analysis, design, fabrication, planar structures (such as buildings and bridges), tubular structures (both onshore and offshore), and economy. The commission aims to facilitate information exchange and harmonization of national standards related to welded structures. Recent activities have included developing guidelines for welded structures under seismic, impact, or blast loads, addressing weld design and welding of high-strength steels, exploring advanced welding processes, establishing fabrication quality requirements, and setting standards for weld joint preparation, structural repair, and optimization in design and fabrication processes.

Commission XV collaborates closely with industry groups to develop design guidelines for welded joints in tubular structures, focusing on both static and fatigue loading conditions. It also contributes to ISO standards in this area. Additionally, it works in tandem with Commission XIII on fatigue effects in welded structures, maintaining a Joint Working Group and holding joint meetings to exchange relevant information. Furthermore, Commission XV collaborates with other IIW working groups when their activities intersect with fabrication or performance aspects of welded structures.

C-XVI / POLYMER JOINING AND ADHESIVE TECHNOLOGY

Prof. Dr Ing Sergio Amancio

The annual assembly highlighted exceptional contributions in polymer welding, additive manufacturing, adhesive bonding, and hybrid metal-polymer joining. Recent research results, spanning fundamental and applied aspects, were presented. Prof. Dr. Grewell stepped down after six years as chair, leaving a solid basis and paving the way for the newly elected team: Prof. Dr. Sergio Amancio (chair) from Graz University of Technology (Austria) and Dr. Klaus Schricker (vice-chair) from Ilmenau University of Technology (Germany). The new team is dedicated to continuing and expanding the preceding chair's work on welding and adhesive bonding of polymers. C-XVI's five-year strategy will additionally prioritize new topics on joining and additive manufacturing of hybrid materials and structures, including metal-polymer, ceramic-polymers, wood-polymer, and fiber-reinforced thermoplastics. These topics are vital for lightweight applications in green propulsion systems for electric and H2-powered vehicles, airplanes, and ships, addressing additional weight challenges arising from heavy battery blocks and storage tanks. Essential for overcoming these engineering challenges are hybrid structures, demanding advanced technologies and investigations into process-related material changes. Collaboration with key industrial and academic stakeholders, along with engagement with other commissions addressing similar multi-material structure topics, will be a focal point in the coming years.



C-XVII / BRAZING, SOLDERING AND DIFFUSION BONDING

Dr Huaping Xiong

In 2023, besides the 76th IIW Annual Assembly, we held two intermediate meetings within C- XVII, one in April in Cambridge, UK, and the other one in Oct. in Qingdao city, China. In 2023 we also accomplished a full leadership structure by augmenting a vice-chair of sub-commission XVIIA-Brazing (Peng He, from Harbin Institute of Technology, China) and a vice chair of sub-commission XVIIB-Diffusion Bonding (Nick Ludford, from TWI, UK) after election. Furthermore, within C-XVII we have the new secretary, Hong Li from Beijing University of Technology, China. In the last two years within C-XVII 3 most innovative topics were summarized as follows: 1) High entropy filler alloys; 2) Microstructural characterization and control of interfacial reactions for dissimilar joints; 3) Releasing and analysis of residual thermal stresses within ceramic/metal joints. The commission's extensive work is evidenced by the significant number of papers recommended and published in *Welding in the World*, with nearly 15% of papers from 2020 to 2023 focusing on its topics, indicating a continuing trend in the future. Meanwhile, in recent years we always encourage young colleagues and those people with industrial background to join C-XVII activities. The goals of C-XVII are to promote technological progress of Brazing, Soldering and Diffusion Bonding technologies and to gradually reach higher levels of research and productivity for a friendly and sustainable world. For this, for example, the improvement of high entropy filler alloy theory and its industrial practice will be emphasized in the coming years. Besides, in future the collaborations with C-VII and C-XVIII will be continued.



C-XVIII / QUALITY MANAGEMENT IN WELDING AND ALLIED PROCESSES

Mr Robert Shaw

Commission XVIII works to identify, create, develop, and transfer global best practices in the field of quality management for welding and allied processes, focusing on quality management systems and the qualifications for personnel and companies involved in welding and allied processes. As an interdisciplinary body for the IIW, it works with other Commissions to develop industry documents and standards for use by technical experts, quality managers, and production personnel. Commission XVIII recently completed "IIW Recommendations and Best Practices for Welding Inspection - Tasks and Responsibilities" and "IIW Recommendations and Best Practices for Welding Coordination to ISO 14731 - Tasks and Responsibilities." It manages ISO 22688 "Brazing - Quality requirements for brazing of metallic materials" in collaboration with Commission XVII. New topics under consideration include management of intelligent manufacturing, artificial intelligence, and machine learning; adhesive (structural) bonding; auditing guidelines; and guidelines on the inspection of steel structures. C-XVIII will continue its work to improve existing qualification standards and guidelines for welding personnel and for companies, with a careful eye for the needs of new joining processes and new developments in existing processes. This work also supports the work being done within the IIW International Authorization Board (IAB) and other organizations.





WORKING GROUP YOUNG PROFESSIONALS



**DR KITTICHAJ
SOJIPHAN**
(Thailand)

Greetings to all IIW members. During one year of my service as Chair of Working Group Young Professionals (WG-YP) since November 2022, we have developed a core team of WG-YP Steering Committee (WG-YPSC) to support the future and the ongoing project of involving more young professionals and future leaders into the IIW community. I would like to say special thanks to all my WG-YPSC team for their generous support, especially Dr. Ghazal Moeini from Germany who serves now as Young Professional representative of the TMB. She will also be the incoming Chair of WG-YP after my term ends after IIW Annual Assembly this July 2024 in Greece. I also thank Dr. Rosario Russo and Dr. Francesco De Fino from IIW Secretariat team to always be there to help me and WG-YPSC to continue to meet online several times since July 2023 Annual Assembly in Singapore to prepare for our first Online Young Professionals International Conference (YPIC) to be held during 8th-9th February 2024. During YPIC 2024 Online, young professionals and students from around the world can participate, present their research, academic, or industrial work, and get connected to IIW YP network. I would also like to thank all member societies to help sharing about YPIC 2024 Online to people in your country to join IIW YP events.

On behalf of IIW WG-YP, I would also like to give praise to IIW-India to their great contribution to IIW mission of promoting Young Professionals International Conference (YPIC) during the 6th International Congress IC-2024 in Bangalore, India during January 22-24, 2024. In the future, we are looking forward to working more closely with WG-RA, technical commissions, and member societies to support more YP events in different countries and regions around the world. I would like to thank IIW for giving me an opportunity to serve as TMB member and WG-YP Chair for the past few years. It has been a life-transforming journey in which I can look forward to serving IIW more in any possible way that I can in the future. I invite all member societies to continue and find more ways to support young professionals and students to join YPIC Online as well as YP Meeting during IIW Annual Assembly, in which there were 91 YPs and students participated in YP meeting in Singapore and among them continue to be future leader and core team member of WG-YPSC. Finally, I would like to encourage all of you who want to grow your lifelong career to join IIW community and "Join to the future" together.

WORKING GROUP STANDARDISATION

Standardisation is nothing less than a significant part of the IIW DNA. Developing at the international level standards that are able to respond to the global crucial need for safe, efficient and high-quality fabrications is one of the most important outcomes that results from the scientific and technical exchanges taking place in the IIW framework. It also underlines the achievements that can be reached by gathering from all over the world experts from different specific fields, affiliated with different types of organisations (academia, research institutes, multinational corporations, SMEs...). Current projects cover friction-stir welding of ferrous materials, eddy current array testing, and the terminology used in various areas of material joining, processing, and testing.



**MR JÉRÔME
DIETSCH**
(France)



THE MESSAGE OF IAB CHAIR AND CE



MR. FERNANDO MAÑAS
IIW-IAB Chair
(Spain)

In a fast moving and evolving industry, the IIW International Authorisation Board (IAB) continued to make progress towards an effective system to support the welding industry in education and training of its workforce. The goal is to deliver the necessary knowledge and skills for personnel and companies. The IAB accomplishes this goal by identifying, developing, and implementing the System - IIW Education, Training, Qualification and Certification System, worldwide.

In 2023 the IAB network met to continue the technical work being developed in IAB Groups A and B, Education, Training and Qualification and Implementation, Authorization and Certification, respectively. Strategic actions related to IAB governance, and the promotion and marketing of the System were also discussed in in IAB Board. These meetings were held online during the IIW winter meetings and presential in July during the IIW Annual Assembly that took place in Singapore.

IAB members elected a new IAB Chair, Fernando Mañas, General Manager of CESOL-Spanish Welding and Joining Technologies Association.

Several guidelines and rules documents were reviewed and updated.

In 2023, 6.860 Diplomas, 542 Personnel Certificates (new and renewals) and 517 Company Certificates (new and renewals) were issued. These numbers show an overall decrease, around 10%, of awarded diplomas and certificates when compared to 2021. Cumulative, until the end of 2022, 183.561 Diplomas, 2.493 new Personnel Certificates (only new) and 3.015 Company Certificates (only new) have been issued.

For the near future, the challenge is focused on leveraging the implementation of the IIW Education, Training, Qualification and Certification System worldwide through its promotion in the welding industry on a global basis. The promotion actions will need to reinforce IAB contributions to a competitive industry by offering a harmonised, up to date education, training, qualification and certification system for personnel and companies which meets industry needs.



MRS RUTE FERRAZ
CE IIW-IAB
Management Team
(Portugal)



ROLES AND RESPONSIBILITIES: WHO IS DOING WHAT

GROUP A 'EDUCATION, TRAINING AND QUALIFICATION' IS RESPONSIBLE TO:

- Develop and revise the Qualification Guidelines, Alternative Route rules and requirements and deal with Blended Learning Programmes;
- Develop and manage the harmonised examinations.

Approval of the IAB Guidelines is the responsibility of Group A.

GROUP B 'IMPLEMENTATION, AUTHORISATION AND CERTIFICATION' IS RESPONSIBLE TO:

- Develop, maintain, and revise the Rules and Operational Procedures for implementing the Qualification Guidelines and the Certification Systems;
- Grant and confirm authorisations of Authorised Nominated Bodies (ANBs) and Authorised Nominated Bodies for Company Certification (ANBCCs);
- Approve Access Conditions, Transition Arrangements and Blended Learning Programs;
- Appoint Assessors.

Approval of the IAB Rules and Operating procedures is the responsibility of Group B.

IAB Peer, Blended Learning and Lead Assessors are Experts of the IIW-IAB qualification and certification systems and are responsible for assessing ANBs and ANBCCs against the IIW-IAB Rules.

2023 HIGHLIGHTS FROM GROUP A

Scope: Education, Training and Qualification

During 2023 the key activities of the IAB Group A were:

- Continuing the development of Practical and Theoretical harmonised examinations for International Welding Inspector qualification;
- Continuing the development of the Certification System for Welding Inspectors, including development of harmonized exams;
- Review and development of questions used in exams (in 2022) on the harmonised examinations for the levels IWE/IWT / IWS/IWP.

Documents Revised and Developed under IIW-IAB Group A

Guidelines:

- No documents were revised during 2023.

2023 HIGHLIGHTS FROM GROUP B

Scope: Implementation, Authorisation and Certification

During 2023 the key activities of the IAB Group B were:

- Analysis for the implementation of digital diplomas/certificates to start implementation during 2024;.

Documents Revised and Developed under IIW-IAB Group B

Rules:

- Review and updating of several Operational Procedures. Updating of the Rules IAB-001, and Guidelines' log of Changes doc IAB-247, including the inclusion of specific rules for remote oral and written examinations for personnel qualification.



MR HORIA DASCAU
IIW-IAB
Group A Chair
(Romania)



DR STEFANO MORRA
IIW-IAB
Group B Chair
(Italy)



EWF and IIW continue cooperate in the implementation, promotion, and development of the 1st INTERNATIONAL ADDITIVE MANUFACTURING QUALIFICATION SYSTEM (IAMQS)

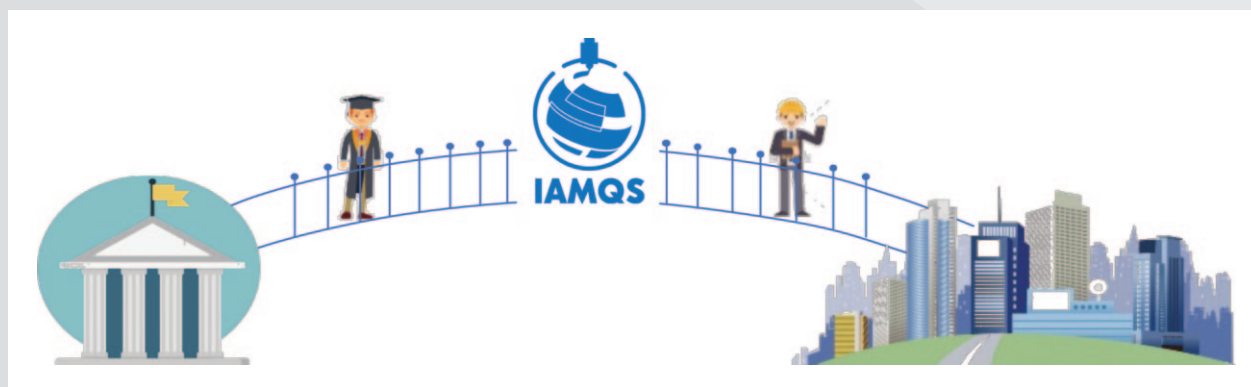
The system is now being implemented in 9 countries around the world (and many more are coming):

- FRANCE
- GERMANY
- GREECE
- ITALY
- MALAYSIA
- PORTUGAL
- SPAIN
- TURKEY
- UK



The IAMQS - International Additive Manufacturing Qualification System was created by industry and for industry to ensure that companies and professionals are equipped with the right set of skills to implement Additive Manufacturing at the industrial level.

AM Qualification System is also based on the engagement with various AM stakeholders operating in the global market, in close connection with Standards requirements and with the support of EU funds. As a result of the skills gap analysis carried out during the last years, IAMQS started by focusing on Metal AM and is broadening its scope for the development of training guidelines for Polymers, as well as additional transversal modules such as sustainability or certification in AM. Thus, ensuring a full alignment with industry requirements and technological breakthroughs, currently offering 12 Qualifications in Additive Manufacturing that are an added value to the sector and to the ones involved in the system: Authorised Nominated Bodies (ANBs), Authorised Training Bodies (ATBs), students and Industry.



The system is managed by EWF and has also been supported by the International Institute of Welding (IIW) with the objective of creating a global network of qualification and training institutions across the world. For more information please visit: <https://iiwelding.org/iamqs/>

2024/25 IIW AND ASSOCIATED EVENTS

FUTURE INTERNATIONAL CONGRESSES

22-24 January 2024
Bangalore, India
INTERNATIONAL CONGRESS (IC-2024)

FUTURE ANNUAL ASSEMBLIES

6-12 July 2024
Rodi, Greece

22-27 June 2025
Genoa, Italy

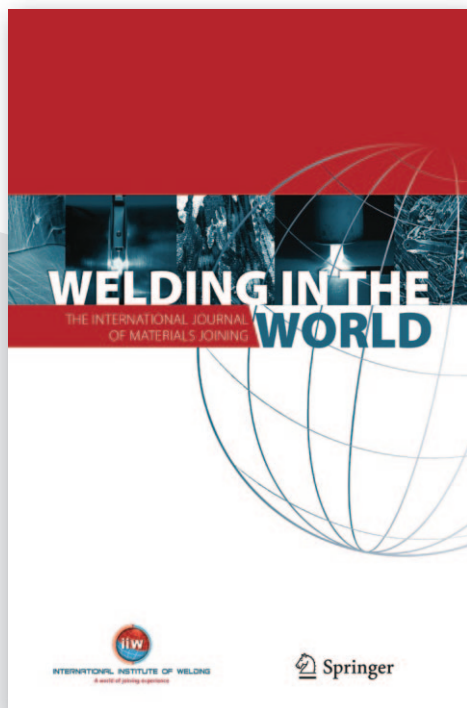


UPCOMING IIW-ASSOCIATED EVENTS

8-9 February 2024
6TH YOUNG PROFESSIONAL INTERNATIONAL CONFERENCE (YPIC 2024)

8-9 May 2024
Budapest, Hungary
JOIN TRANS 2024

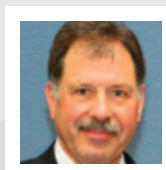
7-10 October 2024
Kyiv, Ukraine
WELDING AND RELATED TECHNOLOGIES 2024



WELDING IN THE WORLD

ANNUAL REPORT 2023

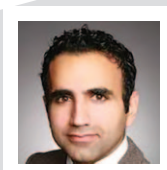
TECHNICAL EDITORS



Prof. John C. Lippold
(USA)



Prof. Américo Scotti
(Brazil)



Dr Ing. Majid Farajian
(Germany)

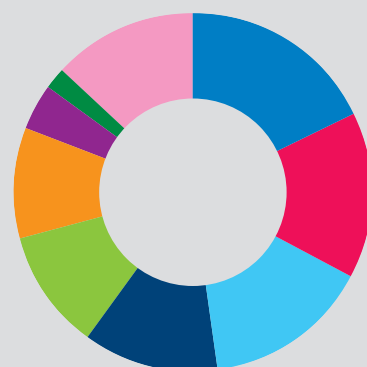


Prof. Thomas Kannengiesser
(Germany)

MANAGING EDITOR Erdmuthe Raufelder (Germany)

In 2023, Volume 67 of *Welding in the World* published 210 papers and over 2800 pages of fundamental and applied research associated with materials joining and allied technologies.

The distribution of papers published in 2023, arranged by Technology Area, is shown in the accompanying figure. The journal continues to publish papers in a wide range of technology areas associated with both welding and joining of materials, and additive manufacturing. A special issue on Additive Manufacturing was published in April and the third Topical Collection on this subject was published online. Nearly 600 papers were submitted to the journal in 2023. The acceptance rate was 34% and average time to first decision was less than 20 days. Also, the average time from paper submission to online publication for Volume 67 was reduced to 154 days with over 60% of papers published in less than 150 days. IIW commissions recommended 123 papers during 2023. As shown in the accompanying table, the journal performance continues to increase based on both Impact Factor (IF) and CiteScore, with an anticipated IF of 2.8 expected for 2023. The number of full text downloads again increased dramatically in 2022 to over 250,000, up 16% from 2021. It is projected that the number of full-text downloads will increase to over 320,000 in 2023.



TECHNOLOGY AREAS

Additive Manufacturing	18%
Metallurgy and Materials	15%
SSW and RSW Processes	15%
Design and Fitness-for-Service	12%
Brazing and Soldering	11%
High Energy Density Processes	10%
Arc Welding Processes	4%
Polymer Joining	2%
Other	13%

WELDING IN THE WORLD - Publication and Performance Data

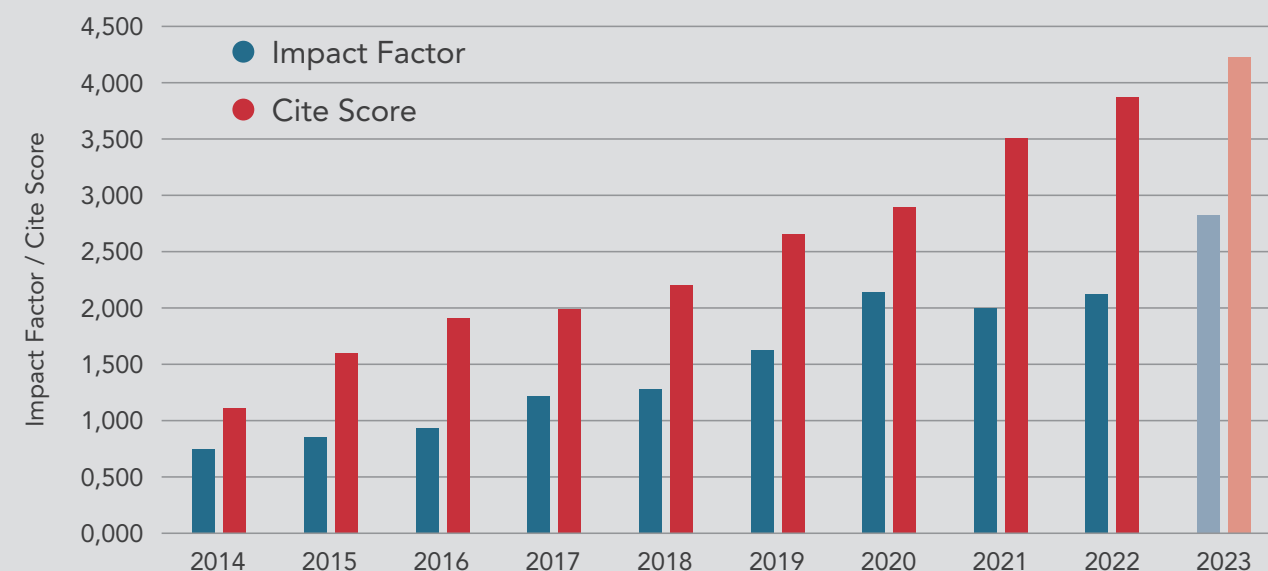
WitW Data	2018	2019	2020	2021	2022	2023
Recommended papers from IIW Commissions	135	156	82	93	143	123
Total Decisions	443	477	580	455	510	~550
Papers published	120	160	179	186	186	210
Pages published	1350	1900	2170	2440	2670	2847
Total Cites	829	939	1,556	2,319	3,255	~4,000
Cite Score	2.2	2.6	2.9	3.5	~3.8	
Full Text Downloads	83,651	111,022	154,897	216,101	250,541	>320,000
FSCI Impact Factor	1.278	1.589	2.103	1.984	2.1	~2.8

In October 2023, Professor Lippold (USA) retired as Editor after 15 years in this position. Professor Norbert Enzinger (Austria) started as an interim Editor in November 2023. His areas of expertise are welding metallurgy and mechanical performance of welded structures, steel metallurgy, and friction stir welding. Additions were also made to the Editorial Board which now consists of 48 members spanning the range of technology topics published in the journal. This group has been critical in assisting the Editors with the pre-screening of open submission papers and the overall execution of the peer review process. There are now over 400 active Principal Reviewers and Reviewers for WitW. The members of the Editorial Board are listed in the accompanying table. The Editors wish to thank all who contribute to the continued success of the journal including authors, working unit chairs and co-chairs, principal reviewers and members of the review panel, the Editorial Board, the IIW Secretariat, and the support staff at Springer. The remarkable progress in the growth and impact of the journal would not be possible without this support structure.

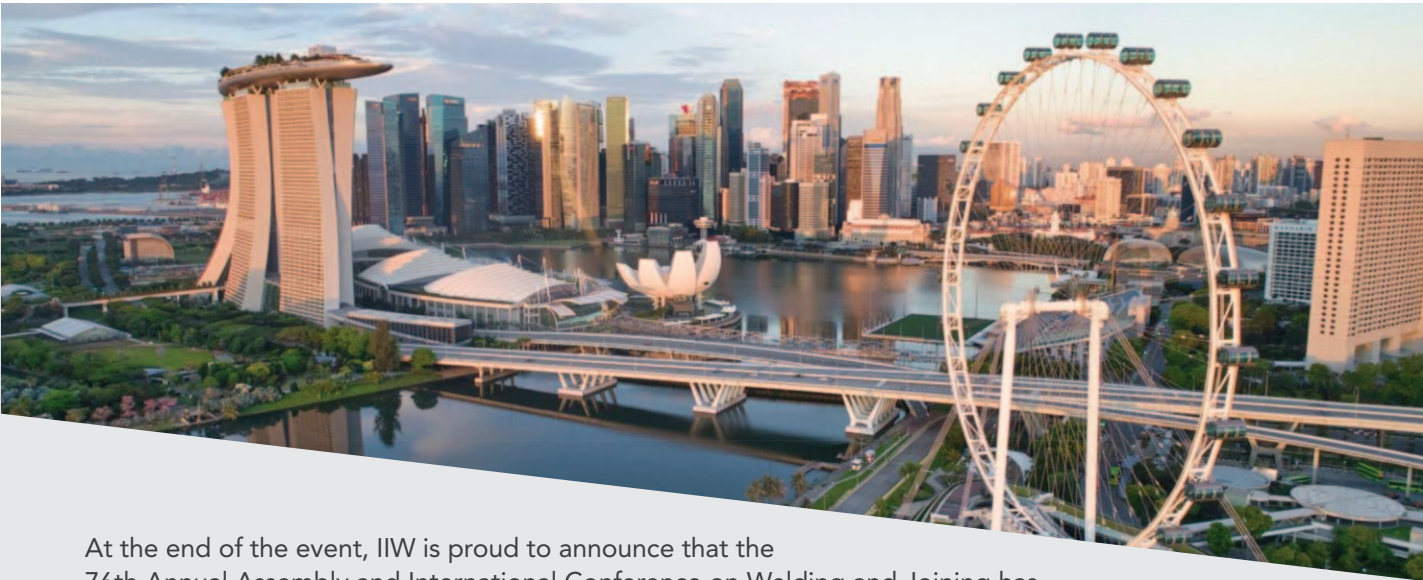
WELDING IN THE WORLD EDITORIAL BOARD, DECEMBER 2023

Shaju Albert (India)	Simon Jahn (Germany)	Michael Rhode (Germany)
Jörg Baumgartner (Germany)	Doug Kautz (USA)	Klemens Rother (Germany)
Jean-Pierre Bergmann (Germany)	Hee Jin Kim (Korea)	Volker Schoeppner (Germany)
Amitava De (India)	Menachem Kimchi (USA)	Aude Simar (Belgium)
Thomas Dupuy (France)	Martin Leitner (Austria)	Jeff Sowards (USA)
Stephan Egerland (Austria)	Hong Li (China)	Manabu Tanaka (Japan)
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Yoshinori Hirata (Japan)	Tony Murphy (Australia)	Elin Westin (Austria)
Pat Hochanadel (USA)	John Norrish (Australia)	Peer Woizeschke (Germany)
Jörg Baumgartner (Germany)	Matthias Pelkner (Germany)	ChuanSong Wu (China)
Jean-Pierre Bergmann (Germany)	Carl Peters (USA)	Huaping Xiong (China)
Amitava De (India)	Gerhard Posch (Austria)	YuMing Zhang (USA)
Thomas Dupuy (France)	Heikki Remes (Finland)	Zhuyao Zhang (United Kingdom)
Erika Hodúlová (Slovakia)	Michael Rethmeier (Germany)	Guisheng Zou (China)

WELDING IN THE WORLD 2014-2023



SINGAPORE 2023



Singapore hosted the 76th IIW Annual Assembly and International Conference on Welding and Joining, 16 to 21 July 2023

After the 2020 and 2021 editions of the IIW Annual Assembly and International Conference held online and the limitations to attending the 2022 edition in Tokyo, the IIW community had finally the opportunity to meet again fully in person in Singapore, and with great excitement for the celebrations of 75 years of the association.

The last three years have strengthened the relationships of the IIW community to continue its relentless work, leading to the great success of this edition of the IIW Annual Assembly and International Conference on Welding and Joining in Singapore, 16 to 21 July 2023, with more than 800 attendees.

IN SUMMARY

- Meetings of IIW Commission and Groups took place 16-21 July 2023, with up to 18 sessions offered each day.
- The IIW International Conference titled **"Advances in Welding, Joining and Additive Manufacturing"** was held on 19 and 20 July with outstanding experts presenting the results of their scientific work and study, and more than 200 papers presented.
- Social events included: the IIW Opening and Awards Ceremony, Young Professionals Ice Breaking event, Welcome Reception, Singapore Nite, and the Closing Ceremony at the Gala Banquet with a ceremony to celebrate 75 years of the IIW.
- Sponsors met the welding professionals at the exhibition area, with videos, product presentations and displays.
- The IIW 2023 Digital Collection Welded Art Photographic Exhibition - Sustainable Development Goals (<http://iiwelding.org/2023-Digitalcollection>), was launched and displayed throughout the whole event.
- The event was the occasion to launch the new IIW Visual Identity, with a new IIW logo, a new website and a new set of products soon available to the global welding community.

RUNNING THE EVENT

The 76th IIW Annual Assembly and International Conference was hosted by the local member society of IIW, the Singapore Welding Society (SWS), supported by the IIW Secretariat and IAB Management Team.

Registration started on 15th February 2023 and the conference centre was officially opened on 16 July, facilitating the participation of over 800 people.



Opening Ceremony



Young Professional Event



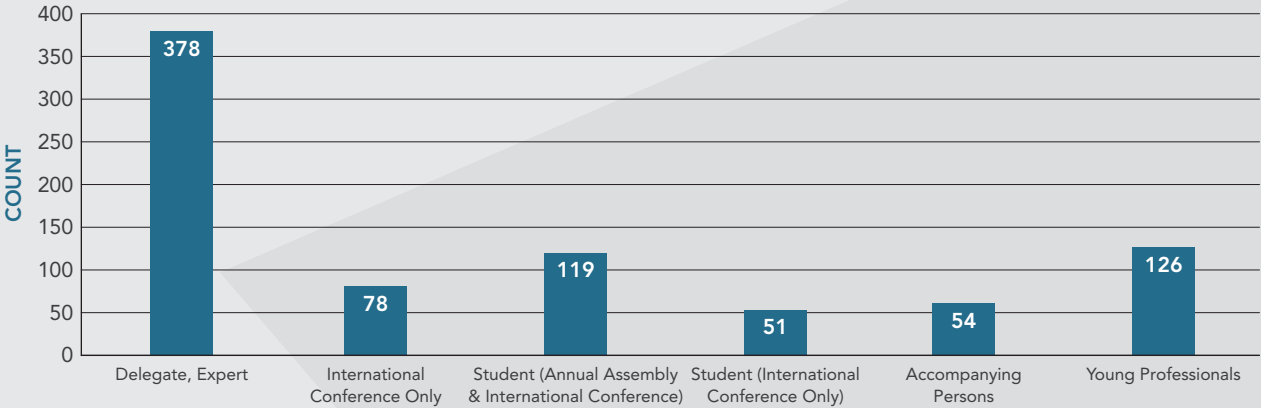
General Assembly



Singapore Nite

- At the end of the event, IIW is proud to announce that the 76th Annual Assembly and International Conference on Welding and Joining has been a huge success with great participation globally and significant and prolific technical output:
- 47 Countries represented.
 - 30 – 190 participants per session.
 - 378 Professors, Doctors, Engineers, and professionals.
 - 245 Young Professionals and students.
 - 129 attendees to the International Conference only.
 - 20 participants (delegates, experts and young professionals) from Ukraine attended remotely due to heavy restrictions to international travels and based on the specific commitment of the IIW to support their national welding community.

IIW 2023 Registration statistics (physical attendance)



47 Countries were represented at the 76th IIW Annual Assembly and International Conference on Welding and Joining. As usual, participants were grouped in delegations managed by the IIW Member Societies, the national welding organisations of IIW member Countries.

Participants per Country

COUNTRY	COUNT	COUNTRY	COUNT	COUNTRY	COUNT	COUNTRY	COUNT
Australia	17	Hungary	9	New Zealand	1	Slovenia	5
Austria	18	India	36	Nigeria	3	South Africa	1
Belgium	9	Indonesia	13	Norway	2	Spain	2
Canada	16	Ireland	2	Oman	4	Sweden	13
China	145	Israel	1	Poland	6	Switzerland	5
Czech Republic	3	Italy	20	Portugal	3	Taiwan	1
Denmark	3	Japan	80	Romania	2	Thailand	9
Finland	14	Korea	74	Russia	28	Turkey	2
France	13	Malaysia	5	Saudi Arabia	3	Ukraine	20*
Germany	101	Myanmar	2	Serbia	2	United Kingdom	15
Greece	4	Namibia	1	Singapore	35	United States	54
Hong Kong	3	Netherlands	4	Slovakia	8		

IIW is grateful to the organizations that sponsored the event for their support:

- Yan San Metals (*GOLD* sponsorship)
- Addept3D Pte Ltd, TRUMPF Pte Ltd, Lincoln Electric (*SILVER* sponsorship)
- Kiswel, CETIM, Yanda (Haimen) Heavy Equipment Manufacturing Co. Ltd (*BRONZE* Sponsorship)

PRESTIGIOUS AWARDS

During the Opening Ceremony of the 76th IIW Annual Assembly of the International Institute of Welding (IIW) IIW honored the winners of prestigious IIW Awards and acknowledged their contributions to welding and joining around the world. IIW is proud to promote and recognize distinction through its numerous prizes and awards, often sponsored by Member Societies. Many are named to pay tribute to eminent individuals who were founding fathers of IIW or champions of its global role or made significant contributions to the development and implementation of scientific and technical advances in welding and allied processes. It was the dedication and vision of these famous IIW personalities which set the stage for the organisation to be recognized today as the largest and most prestigious worldwide network for the exchange of knowledge and cooperation in a wide range of joining and related technologies. At this 76th IIW Annual Assembly, IIW Annual Awards acknowledge not only people with outstanding accomplishments or technical achievements, illustrious careers or long and meritorious service to the IIW around the world, but also encourage promising young professionals who are our future industry and Institute leaders. Heartiest congratulations go to the 76th IIW Annual Assembly winners whose achievements and professionalism, whether at the peak of the mountains or in the foothills, are outstanding examples of determination on the pathway to excellence.

- Fellow of the IIW, awarded to Jorge Dos Santos, Norbert Enzinger and Thomas Kannengiesser
- Evgeny Paton Award, awarded to Murali Tumuluru
- Arthur Smith Award, awarded to Herbert Staufer
- Yoshiaki Arata Award, awarded to Sergio Amancio
- Thomas Medal, awarded to Takeshi Araya
- Chris Smallbone Award, awarded to Solomon Edebiri
- Walter Edström Medal, awarded to Gary Marquis
- Henry Granjon cat. A Award, awarded to Dongsheng Wu
- Henry Granjon cat. B Award, awarded to Banglong Fu and Niklas Sommer
- Henry Granjon cat. D Award, awarded to Wenhua Jiao
- Halil Kaya Gedik Award awarded to W. Richard Polanin
- Welding in the World Best Paper award, Category A: Welding Processes and Additive Manufacturing awarded to Haichuan Shi
- Welding in the World Best Paper, Category B: Materials and Metallurgy awarded to Shotaro Yamashita
- Welding in the World Best Paper, Category C: Structural Integrity, Design and Fitness for Service awarded to Antti Ahola

CELEBRATING 75 YEARS OF IIW CONTRIBUTIONS TO THE QUALITY OF LIFE

The annual assembly in Singapore was the occasion to celebrate 75 years of history of IIW. During the Gala Banquet, the milestones of the association were run through since the foundation in 1948 from the associations of 13 countries, until today with over 50 countries represented and more interested in joining. During the past 75 years, IIW contributed to the development of science by sharing knowledge and experiences on welding and allied processes, offering qualifications and certifications and developing best practices, standards and guidance documents that are now part of the global manufacturing culture.

During the celebrations, the following individuals and organisations received a certificate of appreciation from IIW for their outstanding contributions to the development of the association:

- | | | |
|-------------------------------|-------------------|------------------|
| • Damian Kotecki (Posthumous) | • Adolf Hobbacher | • John Lippold |
| • Glenn Ziegenfuss | • Hee-Jin Kim | • Weld Australia |

This was also the occasion for the hand-over of the Presidency from Sorin Keller (Switzerland) ending his term, to Thomas Böllinghaus (Germany). A token of appreciation was also awarded to S. Keller.



Celebrations of IIW 75th Anniversary



Hand-over of the IIW Presidency

THE ARTISTIC SOUL OF WELDING 2022 DIGITAL COLLECTION

The 2023 welded art photographic exhibition resulted from the very successful initiative launched at the IIW Annual Assembly in 2019 in Bratislava, Slovakia. Since then, IIW already held three very successful IIW Welded Art Photographic exhibitions in 2020, 2021 and 2022 as downloadable digital collections.

In 2023, the *Welded art Photographic exhibition Digital collection* has been linked with the Sustainable Development Goals (SDGs) developed by the United Nations (UN).

UN has 193 countries as members and with the challenges of improving the quality of life in countries, in 2015, world leaders agreed to the implementation of 17 Sustainable Development Goals (SDGs) aimed at low and middle-income countries. IIW has linked its National Welding Capability (NWC) Project and the SDGs so that strategies can be introduced by a country including implementing a Flagship Programme with a single global focus "To Assist the Country to Establish, Sustain and Improve Its National Welding Capability and Progress its UN Sustainable Development Goals".

Such a Programme may have many initiatives and projects associated with it but all related to the single global focus. As such the IIW 2023 Digital Collection was developed with the cooperation and collaboration of 36 artists and 36 exhibits from 16 countries linking any masterpiece to SDGs Further information and the full collection are available at <http://iiwelding.org/2023-Digitalcollection>.



FUTURE IIW EVENTS

IIW is looking forward to gathering the welding, joining and associated processes community together at upcoming Regional and International Congresses and associated events held in cooperation with its partners, and in particular, the 77th IIW Annual Assembly and International Conference on Welding and Joining which will take place from 7th to 12th July 2024 at Rhodes Palace Hotel (Rhodes, Greece), Europe's leading destination for business, leisure and entertainment.



RECOGNITION 2023 IIW AWARDS

HONOURING SIGNIFICANT CONTRIBUTIONS TO
WELDING AND JOINING TECHNOLOGY AND
THE INTERNATIONAL INSTITUTE OF WELDING

At this Opening Ceremony of the 76th IIW Annual Assembly of the International Institute of Welding (IIW) is honoring the winners of this year's prestigious IIW Awards and acknowledging their significant contributions to welding and joining around the world.

IIW Awards recognise a wide range of achievements such as outstanding technical accomplishments and contributions to IIW Working Units, illustrious careers in the industry or academia, contributions to global advancement and meritorious service to IIW.

At this 76th IIW Annual Assembly, IIW Annual Awards acknowledge not only people with outstanding accomplishments or technical achievements, illustrious careers or long and meritorious service to the IIW around the world, but also encourage promising young professionals who are our future industry and Institute leaders.

IIW is proud to promote and recognise distinction through its numerous prizes and awards, often sponsored by Member Societies. Many are named to pay tribute to eminent individuals who were founding fathers of IIW or champions of its global role, or made significant contributions to the development and implementation of scientific and technical advances in welding and allied processes. It was the dedication and vision of these famous IIW personalities which set the stage for the organisation to be recognised today as the largest and most prestigious worldwide network for the exchange of knowledge and cooperation in a wide range of joining and related technologies.

Our heartiest congratulations go to the 76th IIW Annual Assembly winners whose achievements and professionalism, whether at the peak of the mountains or in the foothills, are outstanding examples of determination on the pathway to excellence.

2023 Awards for Careers Achievements and Contributions of IIW

FELLOW OF THE IIW AWARD

Sponsored by IIW

Recognises individuals with a minimum of 10 years' active participation in IIW who have made distinguished contributions to welding science and technology and promoted and sustained the professional stature of the field

JORGE DOS SANTOS

PhD in Welding Technology (1983, Cranfield University, UK).
MSc in Physical Metallurgy (1978, Federal University Rio de Janeiro, Brazil).
Chief Materials Scientist at the Pacific Northwest National Laboratory, Energy Processes and Materials Division, Applied Materials and Manufacturing Group, Richland (WA), USA.
Senior Scientist (Joint Appointment), Department Solid State Materials Processing, Institute of Materials Mechanics, Helmholtz-Zentrum Hereon, Germany.
Hon. Professor for Solid State Joining Processes, Technical University Ilmenau, Mechanical Engineering Faculty, Germany.

NORBERT ENZINGER

In 1996 he finished his study "mechanical engineering and economics" at Graz University of Technology. Subsequently he was project leader at the Materials Center Leoben MCL from 1999 until 2003. In cooperation with Siemens the development and distribution of welding residual stresses was investigated numerically as well as experimentally and summarised in his PhD thesis which he defended with distinction in Jan. 2003. In 2004 he became assistant at the Institute for Materials Science and Welding at Graz University of Technology. Based on these activities Norbert Enzinger habilitated in March 2010 for "welding technology and failure case analysis". From 2020 to 2021 he was appointed guest Professor for Welding Metallurgy at University West in Sweden.

THOMAS KANNENGIESSER

Univ.-Prof. Dr.-Ing. habil. Thomas Kannengiesser, born in 1971, studied mechanical engineering with a specialization in materials engineering and testing at the University of Magdeburg and was a doctoral student at the BAM Federal Institute for Materials Research and Testing in Berlin (Germany). He completed his doctorate at the Institute for Materials and Joining Technology at the University of Magdeburg. Since 2000, he has led numerous research and development projects in the safety of welded components and supervised numerous PhD students at BAM. In addition to his duties as head of division at BAM, he has been a university professor at the University of Magdeburg since 2014.

Prof. Kannengiesser has been active in IIW for over twenty years. Since 2005, he has been the German delegate to C-II and served as the Chairman of Sub-commission IIA, Metallurgy of Weld Metals. His areas of expertise include weldability and welding metallurgy of structural steels as well as load and crack analyses for welded joints.

Prof. Kannengiesser is recognized as a leading international expert in the welding metallurgy and mechanical performance of structural steels. He has published over 200 papers on these and other topics, including over 40 papers in Welding in the World. He has also been active in the development of standards and guidelines, including ISO standards for weldability testing and the measurement of hydrogen in weld metals. Prof. Kannengiesser was nominated to serve as an Editor of Welding in the World starting in September 2022.

EVGENY PATON AWARD Sponsored by the Ukrainian E.O. Paton Electric Welding Institute
Recognizes individual who has made a significant contribution to science and technology through his lifetime dedication to «applied research and development in the field of advanced technologies, materials and equipment for welding and allied processes

MURALI TUMULURU

Murali Tumuluru is a Senior Welding Consultant with Tumuluru Welding Consulting, LLC and has more than thirty years of experience in welding research. He spent over twenty years in the steel industry working on weldability of advanced high strength steels. He has done pioneering research to understand the weldability, fracture behavior, how to successfully weld the Advanced High Strength Steels (AHSS) and has helped with the implementation of Generations 1 and 3 AHSS steel grades in the automotive industry. He has published widely about the weldability of these steels and has given numerous invited presentations and educational seminars. He holds degrees from Rensselaer Polytechnic Institute and The Ohio State University in Materials and Welding engineering. Since leaving the steel industry, he has been consulting in the field.

Tumuluru has been an active member of Commission III, and now serves as the Co-Chair of Commission IIIA. He is a Principal Reviewer for Welding in the World. He has received numerous awards for his research from the American Welding Society (AWS), some of which include the James F. Lincoln Gold Medal Award (2008 and 2011) and the AF Davis Silver Medal Award (2013). He also received the Elihu Thomson Resistance Welding Award (2012) for Outstanding Contributions to the Advancement of Resistance Welding, the William Irrgang Medal Award (2019) for doing the most to Advance the Science and Technology of Welding, and the RD Thomas Memorial Award (2019) for a Substantial Contribution to the Activities of IIW. Tumuluru is a Fellow of both the AWS (2013) and the IIW (2021).



ARTHUR SMITH AWARD Sponsored by the UK Delegation
Conferred upon an individual who, over numerous years, has given dedicated service to the objectives of IIW, particularly in the work of the Commissions

HERBER STAUFER



Dipl.-Ing. Dr. Herbert Stauffer studied mechanical engineering at the University of Technology Vienna, Austria and was a young professional at the Institute of Material Science and Testing. During this period, he graduated to the European Laser Engineer (Cambridge, Vienna) and has completed his Ph.D. in material science and fracture mechanics.

Herbert Stauffer has a strong industrial experience, interest, and involvement in laser-arc hybrid techniques longer than 25 years. Within Fronius International, he is responsible for research and development of laser-arc hybrid welding for industrial applications. In this time, more than 30 scientific papers are published on international conferences and journals and Welding in the World as well.

2016 he has been elected to the IIW Chairman of Commission IV (Power Beam Processes). During this period, he was also a member of the IIW Editorial Board and until 2021 a member of the IIW Technical Management Board. Since 2022 he is the Vice-Chairman of the Working Group Technical Working Unit.

YOSHIAKI ARATA AWARD Sponsored by the Japanese Delegation
Recognizes individual who has realized extraordinary achievements in fundamental research in welding science and technology and its allied areas, which have been recognized as significant contributions to the progress of welding engineering and related fields

SERGIO AMANCIO



Univ.-Prof. Dr.-Ing. Sergio Amancio is a full professor for aviation materials and manufacturing techniques at Graz University of Technology - TU Graz (Austria). He is a deputy head of the Institute of Materials Science, Joining and Forming and chair of the 'Austrian Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology (BMK) Endowed Professorship for Aviation'. Furthermore, Sergio Amancio is an adjunct professor in the Welding Engineering Program at Ohio State University (USA) since 2020.

The focus of his work has been on the correlation between processing parameters, microstructure and material properties aiming at developing, understanding and optimizing joining and additive manufacturing techniques for lightweight engineering structures. Before joining TU Graz, he was a Helmholtz-Young Investigator group leader at Helmholtz-Zentrum Geesthacht (Germany) and an Assistant Professor for Joining Technology at the Institute of Polymer Composites of Hamburg University of Technology - TU Hamburg (Germany). Prof. Amancio has developed and patented new manufacturing techniques for polymer-metal hybrid structures. He has been awarded 22 patents, co-published over 275 technical publications and co-edited 3 technical books, including the first technical book on joining technology of metal-polymer structures in 2018. Prof. Amancio-Filho is a recipient of national and international awards, including the 'Granjon Prize 2009' of the International Institute of Welding, the 'German High Tech Champions 2013' of the German Federal Ministry of Education and Research (BMBF), the 'Georg-Sachs Prize 2014' and the 'DGM Prize 2022' of the German Society for Materials Science (DGM). Since 2009, Prof. Amancio is an expert and delegate member at different IIW commissions, and has served as a technical expert in large number of scientific and technical committees in Europe and Americas.

THOMAS MEDAL Sponsored by AWS
Rewards an individual who has been involved in IIW/ISO international standards activities and can deliver a lecture on the incorporation of global studies into the standardisation for welding technologies

TAKESHI ARAYA

Dr. Araya (Japan) worked for Hitachi Ltd. at the Mechanical Engineering Research Laboratory and later at the Hitachi Works, where he focused on developing intelligent welding production systems. He received his Doctor of Engineering degree from Nagoya University. After retiring in 1999, he joined Laserx Co., Ltd. where continues to work as an adviser. From 2013 to 2021, Araya also participated in IIW C-VI, as a delegate of Japan focusing on terminology. He was also an expert at IIW-C-XII, publishing papers and giving lectures from 1969 to 1999. He actively participated in ISO/TC 44/SC 7 from 2007 to 2021 as a delegate of Japan, contributing to various documents. He was involved in ISO/TC 44/SC 10 from 2002, creating drafts for laser/machine acceptance test standards. Araya served as a secretary for the Standards Committee of Japan Welding Engineering Society (JWES) since 2008, drafting welding terminology standards for Japan Industrial Standard. He is also involved with technical organizations such as Japan Welding Society and Japan Laser Processing Society.



CHRIS SMALLBONE AWARD

Sponsored by the Member Societies of Bulgaria, Romania, Greece and Serbia
Conferred on an outstanding individual who has made a significant contribution to improve the global quality of life through optimum use and innovation of welding and joining technologies in their region and internationally

SOLOMON EDEBIRI

Solomon Edebiri has spent his last thirty four years in the oil and gas industry offering services in the areas of drilling and related oil and gas operations helping operators solve critical problems. He however spent the last 20 of it supporting government of Nigeria to build welding capacity. Born April 22nd 1962, Dr Edebiri, a national honours holder, holds a certificate in General Welding, National diploma in Welding and Fabrication, post graduate certificate in Business administration; MSc and Ph.D in Business Management; and a Doctor of Science (DSC) Honoris Causa. He attended short courses in the United Kingdom in the areas of non-intrusive inspection, welding inspection, corrosion control, Engineering Repairs and protection, Drilling, Completions, work-over and remedial services; and Professional studies in Leadership.

Dr. Edebiri is Deputy Board Chairman, Mudame University Irrua, Nigeria, Member, IIW Technical Management Board (IIW) (2013 – 2015), Member, IIW Regional Working Group, President Nigerian Institute of Welding (2006 -2022). Established the national welding capability development plan in Nigeria, Chaired the committee that drafted the national policy on welding and welding related fields in Nigeria. He is working with some African Countries to build capacity in welding and related Skills; they include Ghana, Sao Tome, and Principe, Equatorial Guinea, Cameroon, Uganda and Sierra Leone. He is a fellow of petroleum Training institute, Nigeria metallurgical Society. Dr Edebiri has co-authored two books in a learned journal, presented over 100 papers in different fields in the last twenty years.



RECOGNITION
2023
IIW AWARDS

2023 Awards for Outstanding Technical Achievement

WALTER EDSTRÖM MEDAL Sponsored by the Swedish Delegation
Recognizes individual who, at their level of knowledge and responsibility, have provided a remarkable and distinguished contribution to IIW comparable with that made by Walter Edström himself

GARY MARQUIS

Gary Marquis has an MSc degree from the University of Illinois, and a PhD from Helsinki University of Technology. He is currently Professor of Mechanics of Materials and Dean of the Aalto University School of Engineering. Professor Marquis attended more than 20 IIW Annual Assemblies and has accepted increasingly demanding positions of responsibility including eight years as Chair of Commission XIII and three years as Chair of the TMB. He was a member of the IIW Board of Directors for nine years including three years as President, one year as treasurer and three years as Chair of WG Governance.

HENRY GRANJON CAT. A AWARD Sponsored by the French Delegation
CATEGORY A: Joining and Fabrication Technology

In recognition of his outstanding research paper 'In-situ X-ray imaging and multi-physical modeling of keyhole dynamics in laser processing of a medium-entropy alloy'

DONGSHENG WU

Academic background and professional career: After graduating from Joining and Welding Research Institute (JWRI, Osaka University, Japan), Dr. Wu works as a postdoctoral researcher of the Japan Society for the Promotion of Science in JWRI. He focuses his studies on the plasma and molten pool behaviors, element mixing, defects formation, thermal stress evolution and microstructure in advanced arc and laser welding and additive manufacturing based on numerical simulation and experimental visualization, such as computational fluid dynamics, finite element method, spectroscopic measurement system, X-ray transmission system and in-situ ultrahigh-speed synchrotron X-ray imaging method. He also develops some novel mathematic models for the plasma arc and laser.

HENRY GRANJON CAT. B AWARD
CATEGORY B: Materials Behaviour and Weldability

In recognition of his outstanding research paper 'Refill friction stir spot welding of AM50 cast magnesium alloy'

BANGLONG FU

Dr. Ing. Banglong Fu earned B.Eng. and M.Sc. from Shandong University, China, as a student of Prof. Guoliang Qin, and subsequently, received Ph.D. in Mechanical Engineering from Technical University Berlin, Germany, under the co-supervision of Prof. Dr.-Ing. Michael Rethmeier and Prof. Dr.-Ing. Jorge F. dos Santos. His Ph.D. research is a process-oriented project in partnership with Helmholtz-Zentrum Hereon (HEREON) and involved automotive manufacturers, focusing on developing a novel solid-state welding technology, refill friction stir spot welding (refill FSSW), for industrial application. Since 2020, he has been engaged at HEREON as a scientist, and was later promoted to the leader of Spot Welding & Processing Group of Solid State Materials Processing Department. He specializes in friction-based joining technologies, where the primary interest spans both fundamentals of joints' formation/performance and applied aspects with close industrial relevance. His managed team consistently conducts R&D innovations under funding from governments, as well as companies concerning automotive, railway, aerospace markets.

HENRY GRANJON CAT. B AWARD

In recognition of his outstanding research paper 'Grain growth and precipitation behaviour of AISI 430 ferritic stainless steel subjected to pulsed laser beam welding using free-form pulse shaping'

NIKLAS SOMMER

Niklas Sommer obtained his MSc in Mechanical Engineering from the University of Kassel in 2019. Throughout his MSc, Niklas engaged in materials processing using pulsed laser sources. He is currently acting as group leader of the welding division at the Department for Cutting and Joining Manufacturing Processes of the University of Kassel under the direction of Prof. Dr.-Ing. Prof. h.c. Stefan Böhm. His research is focused on laser beam welding as well as DED-based additive manufacturing. Consequently, Niklas has authored multiple publications on the intergranular corrosion behaviour of welded ferritic stainless steels as well as compositionally-graded material combinations obtained by laser-based DED. Furthermore, Niklas is engaged in both, welding and additive manufacturing of shape-memory alloys. In February 2023, Niklas completed his doctorate (Dr.-Ing.) in the field of laser-based DED processes.

HENRY GRANJON CAT. D AWARD

In recognition of his outstanding research paper 'Augmented Virtuality Human-robot Interactive Welding: Principles and Applications'

WENHUA JIAO

After obtaining the bachelor's degree in electrical engineering at China University of Mining and Technology, Wenhua moved to the USA to attend Electrical Engineering at the University of Kentucky where he graduated in 2012 and got the Doctorate (PH.D) in Electrical Engineering in 2015. After being a trainee engineer at Tesla in the USA and teaching assistant at the University of Kentucky, Wenhua is currently a Lecturer at the Nanjing Tech University in China. He is a member of Robot and Automation Professional Committee (Welding Society) of Chinese Mechanical Engineering Society and his research interest are mainly applied machine vision, robotic welding and human-robot collaboration.

HALIL KAYA GEDIK AWARD Sponsored by the Turkish Delegation
Recognises a scientist or engineer's significant contributions to the advancement welding science and technology

W. RICHARD POLANIN

Dr. W. Richard Polanin is a Professor of Manufacturing Engineering Technology and Welding Technology at Illinois Central College and although retired from full time teaching, he continues to teach. He is currently Co-Principal Investigator for Weld-Ed, the National Center for Welding Education and Training. He holds a Bachelor's and Master's degree from Illinois State University and a Doctorate from the University of Illinois. In addition to his responsibilities as a professor and with Weld-Ed, Dr. Polanin is a consultant in manufacturing engineering, and welding engineering, and inspection. He has published numerous papers and has made many technical presentations in the areas of Manufacturing, Robotics, Welding and Manufacturing Education. Dr. Polanin is a graduate of the Illinois Scholars program sponsored by the Illinois State Board of Education and Illinois Community College Board and is a Certified Manufacturing Engineer, Certified Welding Inspector, and a Certified Welding Educator. He was elected to the AWS 2014 Class of Counselors and Fellows, and was President of the American Welding Society in 2022. He is the Chair of the AWS Education and Training Committee and the Vice-Chair of the International Institute of Welding Education Commission XIV.

WELDING IN THE WORLD BEST PAPER AWARD Sponsored by IIW

Category A: Welding Processes and Additive Manufacturing

In recognition of his outstanding research paper 'Microstructure and properties of TLPB joints of IN718 with 3D waveform structure prepared by SLM'

HAICHUAN SHI



Haichuan Shi, a Ph.D. in engineering, graduated from South Korea Ocean University in mechanical engineering in 2018, and later worked in the School of Materials Engineering, Shanghai University of Engineering and Technology. It has been committed to the development and application of laser 3D printing technology, component optimization and topology, vacuum brazing technology and process research. Published over 30 SCI papers and 4 invention patents. It has successively presided over over more than 10 projects such as the school startup fund, the Shanghai university teacher production, teaching and research plan, and enterprise entrusted projects.

Category B: Materials and Metallurgy

In recognition of his outstanding research paper 'Relationship between ferrite-austenite phase transformation and precipitation behavior of sigma phase in super duplex stainless steel weldment'

SHOTARO YAMASHITA



After graduating from Hiroshima University, I have been engaged in welding research and education as an assistant professor at Osaka University, where I am currently working. I specialize in the field of welding metallurgy. In particular, I am engaged in research on microstructural evolution and their characteristics associated with weld heat effects, in addition to hot cracking and reheat cracking, which are problems during welding. I am working on further understanding and solving problems in welding metallurgy by making full use of both experimental and analytical methods.

Category C: Structural Integrity, Design and Fitness for Service

In recognition of his outstanding research paper 'On the interaction of axial and bending loads in the weld root fatigue strength assessment of load-carrying cruciform joints'

ANTTI AHOLA



Antti Ahola works as a post-doctoral researcher in the research group of Steel Structures at the Department of Mechanical Engineering of LUT University in Lappeenranta, Finland. The research group has focused on studying structural (incl. static and fatigue) performance of steel components, particularly in the context of welded high-strength and ultra-high-strength steels. After getting his PhD (2020, LUT University), Antti Ahola has continued research work in the field of the fatigue of welded joints. He has been contributing to the works in the IIW Commissions XIII (Fatigue) and XV (Design and Fabrication). He has authored approximately 50 scientific articles.



IIW MEMBER SOCIETIES

COUNTRY	ANB	ANBCC	Member(S)	ANB / ANBCC
AUSTRALIA	✓	✓	• Weld Australia	• Weld Australia
AUSTRIA	✓		• Schweisstechnische Zentralanstalt (SZA) • Österreichische Gesellschaft Für Schweisstechnik (ÖGS)	• Schweisstechnische Zentralanstalt (SZA)
BELGIUM	✓		• Institut Belge de la Soudure – Belgisch • Instituut voor Lastetechniek (IBS/BIL)	• Association Belge du Soudage ASBL • Belgische Vereniging voor Lastetechniek VZW
BULGARIA	✓		• Bulgarian Welding Society	• Bulgarian Welding Society (BWS)
CAMEROON <i>Suspended</i>			• Cameroon Welding Association	
CANADA	✓	✓	• Canadian Council of the IIW • Canadian Welding Bureau (CWB)	• Canadian Welding Bureau (CWB)
CROATIA	✓		• Croatian Welding Society (CWS)	• Hrvatsko Društvo za Tehniku Zavarivanja (HDTZ)
CYPRUS			• Cyprus Welding Institute	
CZECH REPUBLIC	✓	✓	• Czech Welding Society ANB (CWS-ANB)	• Czech Welding Society ANB (CWS-ANB)
DENMARK	✓		• Danish Welding Society	• Force Technology
FINLAND	✓		• Suomen Hitsausteknillinen Yhdistys (SHY)	• Suomen Hitsausteknillinen Yhdistys (SHY)
FRANCE	✓	✓	• Institut de Soudure (IS) • Société Française des Ingénieurs et Techniciens en Soudage (SIS)	• Association Française du Soudage (AFS)
GERMANY	✓		• Deutscher Verband für Schweißen und verwandte Verfahren (DVS)	• DVS-PersZert
GHANA			• Ghana Welding Bureau	
GREECE	✓	✓	• Welding Greek Institute (WGI)	• Welding Greek Institute (WGI)
HUNGARY	✓	✓	• Magyar Hegesztési Egyesület (MAHEG) • Hungarian Welding Association (HWA)	• Magyar Hegesztéstechnikai és Anyagvizsgálati Egyesülés (MHTE)
INDIA	✓	✓	• The Indian Institute of Welding - IIW (India)	• The Indian Institute of Welding - IIW (India)
INDONESIA	✓		• Indonesian Welding Society (IWS)	• Indonesian Welding Society (IWS) ANB Committee
ISRAEL			• The Israeli National Welding Committee (INWC)	
ITALY	✓	✓	• Istituto Italiano della Saldatura (IIS)	• IIS CERT Srl
JAPAN	✓		• Japan Institute of Welding (JIW) • The Japan Welding Engineering Society (JWES)	• Japan Welding Engineering Society (JWES)
MEXICO			• Instituto Nacional De Soldadura Asociacion Civil (INSAC)	
MALAYSIA	✓		• Welding Institute of Malaysia Bhd (WIM)	• Welding Institute of Malaysia Bhd (WIM)
MOROCCO			• Association Marocaine du Soudage et des Appareils à Pression (AMS-AP)	
NEW ZEALAND		✓	• Heavy Engineering Research Association (HERA)	• Heavy Engineering Research Association (HERA)
NIGERIA	✓		• Nigerian Institute of Welding (NIW)	• Nigerian Institute of Welding (NIW)
NORWAY	✓		• Norsk Sveiseteknisk Forbund (NSF)	• Norwegian Welding Association (NSF)
PAKISTAN			• The Pakistan Welding Institute	
PEOPLES RÉPUBLIC OF CHINA	✓	✓	• Chinese Welding Society	• Chinese Welding Training & Qualification Committee (CWTQC)
POLAND	✓	✓	• Siec Badawcza Łukasiewicz • Instytut Spawalnictwa	• Łukasiewicz - Instytut Spawalnictwa (L-IS)
PORTUGAL	✓		• Instituto de Soldadura e Qualidade (ISQ)	• Instituto de Soldadura e Qualidade (ISQ)
REPUBLIC OF KAZAKHSTAN	✓	✓	• Karaganda State Technical University (KSTU)	• Kazakhstan Welding Association (KAZWELD)

COUNTRY	ANB	ANBCC	Member(S)	ANB / ANBCC
REPUBLIC OF KOREA	✓		• The Korean Welding and Joining Society (KWJS)	• The Korean Welding and Joining Society (KWJS)
ROMANIA	✓	✓	• National Research Development Institute for Welding and Material Testing (ISIM) • Romanian Welding Association (ASR)	• ASR CertPers • ISIM Cert
RUSSIAN FEDERATION <i>Suspended</i>			• Russian Welding Society • Self-Regulating Organization Non-commercial Partnership National Agency of Welding Control (SRO NP NAKS)	• Research-training center Testing and Diagnostics • Prometey-Cert CJSC
SERBIA	✓	✓	• Zavod Za Zavarivanje A.D.	• DUZS-CertPers • Zavod Za Zavarivanje A.D. – ZAVOD Cert
SINGAPORE			• Singapore Welding Society (SWS)	• Singapore Welding Society (SWS)
SLOVAK REPUBLIC	✓	✓	• Výskumný Ústav Zváracský - Welding Research Institute (VÚZ) • Slovenská zväracská spoločnosť - Slovak Welding Society	• Výskumný ústav zváracský (VUZ) • Certiweld VUZ-PI SR
SLOVENIA	✓	✓	• Slovensko Društvo Za Varilno Tehniko (SVDVT)	• Slovensko Društvo Za Varilno Tehniko (SDVT)
SOUTH AFRICA	✓	✓	• Southern African Institute of Welding (SAIW)	• Southern African Institute of Welding (SAIW)
SPAIN	✓	✓	• Asociación Española de Soldadura y Tecnologías de Unión (CESOL)	• CESOL - Asociación Española de Soldadura y Tecnologías de Unión
SWEDEN	✓		• Svetskommissionen - Swedish Welding Commission (SWC) • Swedish Welding Society	• Svetskommissionen
SWITZERLAND	✓		• Schweizerischer Verein für Schweißtechnik (SVS/ASS) • Association Suisse pour la Technique du Soudage	• Schweizerischer Verein für Schweißtechnik (SVS/ASS)
THAILAND	✓		• Welding Institute of Thailand (WIT)	• Welding Institute of Thailand (WIT)
THE NETHERLANDS	✓	✓	• Nederlands Instituut Voor Lastetechniek (NIL) • Netherlands Institute of Welding	• Nederlands Instituut Voor Lastetechniek (NIL)
TUNISIA			• Centre Technique des Industries Mécaniques et Electriques (CETIME)	
TURKEY	✓		• Gedik Education and Social Benefits Foundation (GEV) • Istanbul Gedik University Middle East Technical University • Middle East Technical University	Gedik Education and Social Benefits Foundation / Turkish Welding Technologies Academy (GEV/TKTA)
UKRAINE	✓	✓	• E.O. Paton Electric Welding Institute Quality Assurance and Certification	• The Paton Welding Institute Training and Qualification Centre • International Scientific-technical Centre of
'PATONCERT'				
UNITED KINGDOM	✓	✓	• UK Section of the IIW	• TWI Certification Ltd.
UNITED STATES OF AMERICA		✓	• American Welding Society (AWS) • Edison Welding Institute (EWI)	• United States of America Authorised National Body for Company Certification USA ANBCC
VIETNAM	✓		• Vietnam-German Technology Transfer and Training Center (HWC)	• Vietnam-German Technology Transfer and Training Center (HWC)