



**iiw** 2023 Annual Assembly & International Conference

SINGAPORE, 16-21 JULY, 2023

# welded art PHOTOGRAPHIC exhibition

IIW 2023 Digital Collection >

SUSTAINABLE  
DEVELOPMENT **GOALS**



# Welcome Message

As Acting President of the International Institute of Welding, it is my privilege to welcome you to our fourth IIW Digital Collection on Welded Art and for you to view some of the 2023 outcomes resulting from the very successful initiative launched at the IIW Annual Assembly in 2019 in Bratislava, Slovakia.

The **International Institute of Welding (IIW)** was founded in 1948 by the welding institutes or societies of 13 countries that considered it crucial to make more rapid scientific and technical progress in welding possible on a global basis. Its membership today comprises welding organisations from 51 countries worldwide.

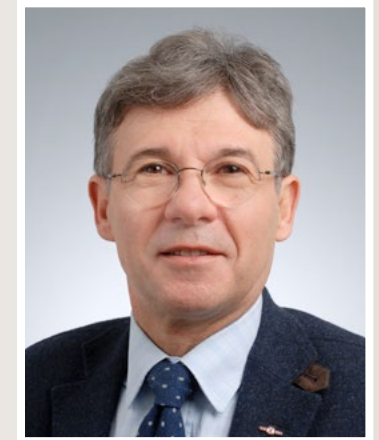
IIW provides a **unique cooperative and collaborative** platform for experts, practitioners and policy makers in the welding and related industries to share not only technical information and innovation, but knowhow in all areas affecting a country's ability to achieve sustainable development in a sustainable environment and fulfil their responsibilities in a cooperative and converging global community.

We are proud that this IIW 2023 Digital Collection shows the excellent IIW ethos of cooperation and collaboration with 36 artists from 16 countries contributing to creating greater awareness of the importance of the relationship of the global welding industry to progressing the UN Sustainable Development Goals.

Please enjoy and pass the Collection onto your friends and colleagues.

**Sorin Keller, IIW Acting President 2021-23**

1 July, 2023



**Sorin Keller**

*IIW Acting President 2021-2023*



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# Acknowledgements

Whether it is an individual, a team or a group of artists across the different welded art activities, all deserve our sincere thanks and appreciation for participating with great enthusiasm in helping to achieve our objective to demonstrate the value and benefits of welding and welded art in the promotion of the UN Sustainable Development Goals.

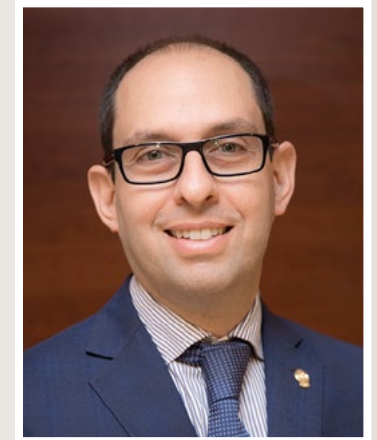
The interactions between the Exhibition Coordinator and artists have all been outstanding and the contributions greatly appreciated, particularly as participation is entirely voluntary. 36 artists from Australia, Brazil, Bulgaria, Cameroon, Canada, India, Kazakhstan, Montenegro, Nigeria, Romania, Serbia, Slovakia, South Africa, Spain, Ukraine and USA have enthusiastically participated with 36 exhibits showcased.

Thanks must also go to those organisations which promoted the exhibition in their countries, and it is hoped that their examples will encourage others to provide similar promotion and support next year.

Since the introduction of the IIW welded art photographic exhibition in 2019 in Slovakia, we have had excellent responses by IIW members to introducing welded art exhibitions and competitions. In particular, I would like to acknowledge the Indian Institute of Welding (IIW-India), Bulgarian Welding Society (BWS) and Romanian Welding Society (ASR) in meeting one of the main objectives of the IIW welded art photographic exhibitions during the past four years, to encourage organisations to hold similar welded art events in the quest to promote the image of welding and careers to young people.

**Luca Costa, IIW Chief Executive Officer**

1 July, 2023



**Luca Costa**  
*IIW Chief Executive Officer*





# Foreword

## IIW, its National Welding Capability (NWC) Project and the UN Sustainable Development Goals (SDGs)

As the world population continues to grow, the pressures on manufacturing, infrastructure and power generation, not to mention basic needs such as food, water, shelter and education, have become enormous common challenges. The welding industry is a significant global industry and, together with welding as an enabling technology, it plays a critical role in the world's ability to cope with these pressures and changes.

## IIW National Welding Capability (NWC) Project

The IIW community is dedicated to the concept of helping all countries build their own sustainable welding capabilities to meet these challenges and improve the quality of life for their people and all mankind. The IIW Project "Establishing a National Welding Capability (NWC) in a Country" is a means of achieving this.

An IIW Task Group is presently finalising a report which is an outcome of the IIW National Welding Capability (NWC) Project to provide guidance, including practical ideas and recommendations, on how a country's welding industry can improve its national welding capability and simultaneously progress targeted UN Sustainable Development Goals (SDGs), as well as complement other initiatives being taken by governments, aid agencies, industry and like-minded organisations.

It is hoped that the guidance, ideas and recommendations in the report will lead to enhanced cooperation and collaboration between countries, governments, industries, aid agencies and organisations in mutually beneficial projects to enhance the NWCs and SDGs.

## IIW Member NWC and SDG Reports

Various countries have published reports in 2022 on how their welding industries are striving to improve their NWCs and SDGs. The links are shown below. Several of these countries also hold **welded art exhibitions and competitions** to support such initiatives.

New Zealand, <https://www.hera.org.nz/resource-unsdg/>

India <http://iiwindia.com>

South Africa, <https://www.saiw.co.za/south-africas-national-welding-capability-nwc-and-its-significance-to-the-un-sustainable-development-goals-sdgs/>.

Romania [https://asr.ro/papers/ASRandRomania'sNationalWeldingCapability\(NWC\)andtheirsignificancetotheUNSustainabilityDevelopmentGoals\(SDGs\).pdf](https://asr.ro/papers/ASRandRomania'sNationalWeldingCapability(NWC)andtheirsignificancetotheUNSustainabilityDevelopmentGoals(SDGs).pdf)



**Chris Smallbone**  
Exhibition Co-ordinator  
Editor  
IIW President 2005-2008



Brazil <http://www.femec.ufu.br/en/acontece/2022-06-uberlandia-federal-university-abs-and-brazils-national-welding-capability-and-their-ABS-in-Eventos> <https://abs-soldagem.org.br> ; and

Ghana <https://giwelding.org>

Nigeria Welcome – Nigerian Institute Of Welding ([niw.ng](http://niw.ng))

### Examples of IIW Cooperation and Collaboration

From 7-9 April, 2016, IIW-India hosted the **6th IIW Welding Research and Collaboration Colloquium (WRCC) in Hyderabad.**



Participants in IIW Welding Research and Collaboration Colloquium, Hyderabad, India.

Attended by over 130 participants from 12 countries it provided a unique opportunity for international researchers from universities, industries and governments to meet, present, and discuss the research and development work they are conducting, or planning to do, alone or in cooperation and collaboration with other researchers. It provided unique networking and career promotion opportunities for young professionals to contribute to improving the quality of life in the region and the NWCs and SDGs.

In conjunction with **the 4th IIW South-East European Welding Congress**, held in Belgrade, Serbia, 10-13 November, 2018, representatives of Bulgaria, Greece, Hungary, Turkey, Romania, Serbia, Bosnia and Herzegovina, Montenegro and Macedonia attended the SEENET National Welding Capability workshop on 10 November, 2018 in Belgrade Serbia.

The main objective was to identify and introduce key activities of cooperation and collaboration which could be undertaken between the **South East European Network (SEENET)** countries in order to improve further activities and hence the NWCs and SDGs.





# Introduction to United Nations Sustainable Development Goals (SDGs)

The United Nations (UN), has 193 countries as members and with the challenges of improving the quality of life in countries, in 2015, world leaders agreed for the UN to implement 17 Sustainable Development Goals (SDGs) aimed at low and middle income countries. The full Sustainable Development Report 2022 giving the Global SDG Index and country reports is on Sustainable Development Report 2022 ([sdgindex.org](https://sdgindex.org))

Each UN country is supposed to measure its progress on an annual basis against the targets and indicators set against each SDG. The title of each SDG and its description together with the number of targets and indicators for each SDG are shown at [https://en.wikipedia.org/wiki/Sustainable\\_Development\\_Goals](https://en.wikipedia.org/wiki/Sustainable_Development_Goals)

The 17 UN SDGs are the blueprint to achieve a better and more sustainable future for all. They address the global challenges we face, including those of poverty, inequality, climate change, environmental degradation, peace and justice. The 17 Goals are all interconnected, and in order to leave no one behind, it is important that we achieve them all by 2030.

## SDG Targets and Indicators

Each SDG has a clear Goal with targets to be achieved by 2030 and indicators for measuring, monitoring and evaluating progress against the Goal. It is not just countries which are being asked to implement the SDGs but also companies, organisations of all types

and even individuals. Since the Goals are interconnected, contributions into one Goal can have a positive effect on other Goals.

There are well documented criticisms and challenges regarding the targets for the UN SDGs not being achieved by 2030. Although some of these may be true, it does not prevent the welding industry in a country attempting to progress the SDGs and give benefits to their populations which might not have arisen without having the focused SDG approach in place.

## IIW Linking the National Welding Capability and the Sustainable Development Goals

The International Institute of Welding (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.

Improving a country's National Welding Capability can make a significant contribution to, and have a very positive effect on, many national and international programmes including the SDGs which also build on various existing national and international agreements.



# SUSTAINABLE DEVELOPMENT GOALS



## List of SDGs

- SDG 1** End poverty in all its forms everywhere.
- SDG 2** End hunger, achieve food security and improved nutrition, and promote sustainable agriculture.
- SDG 3** Ensure healthy lives and promote well-being for all at all ages.
- SDG 4** Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.
- SDG 5** Achieve gender equality and empower all women and girls.
- SDG 6** Ensure availability and sustainable management of water and sanitation for all.
- SDG 7** Ensure access to affordable, reliable, sustainable and modern energy for all.
- SDG 8** Promote sustained, inclusive and sustainable economic growth, employment and decent work for all.
- SDG 9** Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation.
- SDG 10** Reduce inequality within and among countries.
- SDG 11** Make cities and human settlements inclusive, safe, resilient and sustainable.
- SDG 12** Ensure sustainable consumption and production patterns.
- SDG 13** Take urgent action to combat climate change and its impacts by regulating emissions and promoting developments in renewable energy.
- SDG 14** Conserve and sustainably use the oceans, seas and marine resources for sustainable development.
- SDG 15** Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.
- SDG 16** Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.
- SDG 17** Strengthen the means of implementation and revitalise the global partnership for sustainable development.





## Unique international cooperation and collaboration in welded art:

# The Blacksmiths' Tree

The Australian Blacksmiths Association (Victoria) was the Lead Organisation in collaboration with volunteer blacksmiths and blacksmithing organisations across the world and welders and engineers in Australia.

In January and February, 2009, devastating bushfires swept across the state of Victoria killing 173 people, leaving thousands homeless and destroying 400,000 hectares of townships and bushland. Following the fires, the **Australian Blacksmiths Association (Victoria)** asked blacksmiths to forge metal leaves for a gumtree intended as a gift for the fire affected communities. Blacksmiths across Australia and from 28 countries around the world answered the call and sent over 3,500 hand forged gumleaves towards what became known as the Blacksmiths' Tree.

The project engaged a huge team of volunteer blacksmiths, engineers and welders and took five years to construct.

The Blacksmiths' Tree stands in an indigenous garden to remember all of those who perished in the fires of 2009, those who fought the fires and those who continue to live their lives with hope and courage.

Through international friendships formed during the making of the Tree, Australian blacksmiths participated in making steel roses for a memorial sculpture following the attacks in Oslo and Utøya

in Norway in 2011, <https://www.jernrosene.no/english> and forged poppies for the Ypres Peace Monument, a WWI memorial in Belgium <http://www.yprespeacemonument.com/>

### Contact Info

**Blacksmiths' Tree Page:** <https://www.abavic.org.au/>  
(due to be updated later this year)

**Facebook:** <https://www.facebook.com/BlacksmithTreeProject/>

**Forged From Fire:** feature length documentary about the Blacksmiths' Tree: <https://vimeo.com/ondemand/forgedfromfire>

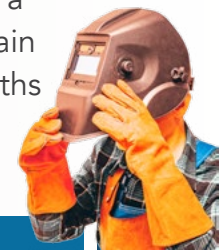
**YouTube:** (footage of welding the Tree here)  
<https://www.youtube.com/user/AusBlacksmiths>

**Email:** [thesec@abavic.org.au](mailto:thesec@abavic.org.au)

### Exhibit

The Blacksmiths' Tree stands behind the Peter Avola Memorial Pavilion, 160 Chadds Creek Road, Strathewen, Victoria, Australia. The Blacksmiths' Tree is lit every night after sunset.

The main structure is forged stainless steel. The trunk, thought to be the longest forged taper in the world was forged under a 1915 Davey press at Overall Forge in Albury, NSW. The 12 main branches were forged by members of the Australian Blacksmiths





Association (Victoria) in their Bundoora workshop with a 120 year old Bradley helve hammer and a Massey power hammer.

Branches were welded to the trunk using Gas Metal Arc Welding (GMAW) full penetration welds.

With many welders needed to attach the 3500 leaves to hundreds of steel twigs and branches, courses were offered for people to learn Gas Tungsten Arc Welding (GTAW) and a temporary welding workshop was set up in a disused factory where the tree could be constructed.

The leaves (approx. 3500) and twigs were welded using Gas Tungsten Arc Welding (GTAW) with stainless steel and silicon bronze rods. There are approximately 2000 stainless steel leaves and 1200 copper leaves. There are also leaves of bronze, silver, titanium, aluminium, chain Damascus steel, silver and glass; all with various degrees of difficulty in joining, and the most delicate leaves requiring the skills of a volunteer jeweller.

**Dimensions:** 3 tonne (2 tonne solid stainless steel trunk, 1 tonne canopy) 10 m high, 6 m diameter canopy.

### **Sustainable use of terrestrial ecosystems:**

The area in which the Blacksmiths' Tree was installed had been hit by the 2009 fires leaving skeletal trees and the ground in dust. In the first years following the fires weeds started to take over the space and black wattle replaced many of the gumtrees. Since the Blacksmiths' Tree was installed, volunteers, local Landcare groups, other community groups and local residents refashioned the area, installing swales to direct and slow down the passage of water and planting an indigenous garden around the Tree.

The existence of the Blacksmiths' Tree and the garden prompted State Government to repair erosion caused by the fires along the nearby creek. Today, the indigenous garden is so successful it is used as a seed bank by Stringybark Nursery, a local community-run indigenous nursery. The space is home to wombats, wallabies, and a variety of native birds; in wet weather when the swales fill with water, frogs are heard throughout the garden.







Photo Credit:  
Amanda Grant,  
Project Manager,  
The Blacksmiths' Tree,  
Australian Blacksmiths  
Association (Victoria)



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# Career Artists

Being an artist allows you to share your art with the world; you can make a difference in the world by sharing your art and your perspective. Art can inspire change, make people feel certain ways, and it can also beautify our world.

We are privileged to have 17 exhibits from 11 career artists to help progress the Sustainable Development Goals. These artists have extensive bodies of work and have consistently garnered national and international acclaim.

They have contributed significantly to the field of the arts, and achieved a sustained reputation to support this. In many cases, their work has been acquired by patrons, collectors, institutions, public bodies and retains a value that reflects this success.

**SDG 1** Exhibit: Silver Lining. Artist: Hilary Clark Cole (Canada).

**SDG 6** Exhibit: Born of the Rain. Artist: Hilary Clark Cole (Canada).

**SDG 9** Exhibit: The Messengers. Artist: Hilary Clark Cole (Canada).

**SDG 15** Exhibit: Forest Floor Quartet. Artist: Hilary Clark Cole (Canada).

**SDG 3** Exhibit: Tearful, Stoic and Joyful. Artist: Mike van Dam (Australia)

**SDG 10** Exhibit: Helping Hands. Artist: Mike van Dam (Australia).

**SDG 13** Exhibit: Earths Custodian. Artists: Ian Haggerty and Mike van Dam (Australia).

**SDG 11** Exhibit: Monument to Ildefons Cerdà. Artist: Jordi Díez Fernández (Spain).

**SDG 11** Exhibit: The Two Architects. Artist: Jordi Díez Fernández (Spain).

**SDG 4** Exhibit: Spring of Knowledge. Artist: Ricard Mira (Spain).

**SDG 5** Exhibit: Monument to Working Women. Artist: Ricard Mira (Spain).

**SDG 12** Exhibit: Steel-making. Artist: Victor Ivanoff (South Africa).

**SDG 2** Exhibit: Digital Cloud over Summer House in Mulberry Tree. Artist: Nedim Hadži Ahmetović Mafa (Serbia).

**SDG 12** Exhibit: Awakening of the Ancestors. Artist: Niteck Youtou Mouloum (Cameroon).

**SDG 17** Exhibit: Hot Composition. Artist: Bogdan Constantin Nueleanu (Romania).

**SDG 7** Exhibit: Obelisk-Prayer for Lost Objects. Artist: Ivana Radovanovic (Montenegro).

**SDG 6** Exhibit: Thirst. Artist: Ryan Schmidt (USA).



# Hilary Clark Cole (Canada)

Canadian sculptor Hilary Clark Cole was born in Victoria, British Columbia and is a graduate of the Ontario College of Art and Design. She has lived and worked in Muskoka since 1971. As well as having her metal sculptures in many private collections, she has created significant public sculptures over the years.

She has won many awards for her sculptures, and she has been profiled on television programmes on the Life Channel, CBC and Global. She is a strong role model in the community and in 2002 won the first YWCA Woman of Distinction Award for Arts and Culture. Her work mainly in hand-built welded steel artwork, which can be very small or very large, rough or smooth, monochromatic or colourful. In particular, they often reflect the importance of biodiversity related to her home country.



## Contact Info

Email: [hcc@vianet.ca](mailto:hcc@vianet.ca)

Website: [www.hilaryclarkcole.com](http://www.hilaryclarkcole.com)

Arts Organization Webpage: [www.muskokaartsandcrafts.com](http://www.muskokaartsandcrafts.com)



# SDG 1

## End poverty in all its forms everywhere

1 NO  
POVERTY



It is hoped that the mobilisation of resources and the establishment of poverty eradication policy frameworks at all levels can be implemented to help achieve the end of poverty by 2030. The eradication of extreme poverty, reduction of all poverty by half, implementation of social protection systems, ensuring equal rights to ownership, basic services, technology and economic resources, and the building of resilience to environmental, economic and social disasters are key to this.

### Exhibit "Silver Lining"

In line with fundamental humanitarian principles, any plan for improving the SDGs, must have as a main objective, the improvement of the quality of life of people in the country and its biodiversity. Most people simply want a job, personal security and health for their family, a decent roof over their heads, education for their children, food in their stomachs and a sustainable positive environment around them benefitting biodiversity.

A silver lining is a metaphor for optimism in vernacular English, which means a negative occurrence may have a positive aspect to it. Something good that can be found from a bad situation. Many people living in poverty wish for such a silver lining.

This is a wall sculpture about 35 cms high, in welded steel, stainless steel, and stained glass. A tiny welded steel figure, rooted to the ground with arms raised, melding into branches like a Daphne, reaching to the sky in a gesture of hope and promise.

The 'burning red' is a stained glass ball. The sculpture has been silver lined with stainless steel.

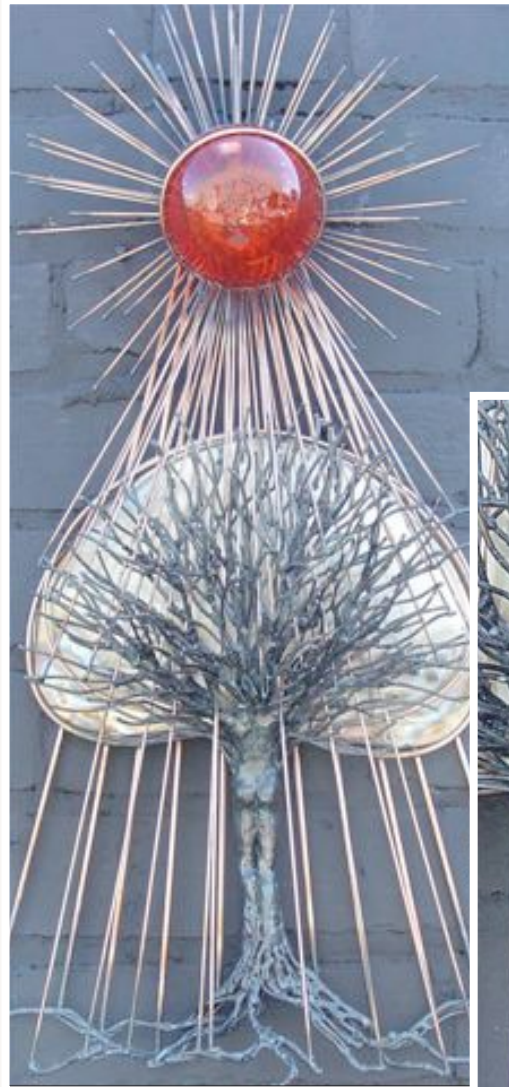
It is inspired by the words of the song by David Gray:

"Take this silver lining, Keep it in your own sweet head, Shine it when the night is burning red, Shine it in the twilight, Shine it on the cold cold ground, Shine it 'til these walls come tumbling down".

### Dimensions of exhibit

35 cm high x 25 cm wide





*Silver Lining*  
Hilary Clark Cole





# SDG 6 Ensure availability and sustainable management of water and sanitation for all

6 CLEAN WATER AND SANITATION



This SDG aims to help to expand water and sanitation support to developing countries, and to support local engagement in water and sanitation management. This will include safe and affordable drinking water, end open defecation and provide access to sanitation and hygiene, improve water quality, wastewater treatment and safe reuse, increase water use efficiency and ensure freshwater supplies, implement Industrial Waste Management Evaluation, protect and restore water-related ecosystems.

## Exhibit "Born of the Rain"

Life without water could simply not exist.

"In one drop of water are found all the secrets of all the oceans, in one aspect of You are found all the aspects of existence". Kahlil Gibran.

A watershed is a land area that channels rainfall and snowmelt to creeks, streams, and rivers, and eventually to outflow points such as reservoirs, bays, and the ocean.

A Watershed is Nature's force at work rather than a concrete human idea, and there is a certain sense of life unfolding as it should. But in reality it is about a never ending battle; our little human race meets big powerful Nature head on, and we must both win, for all life depends on water.

Born of the Rain is a low-relief wall sculpture, hand built of mild steel and stainless steel sheet, and mild steel rod. It is hammered, welded and torch coloured.

A description of the exhibit depicting a watershed channelling the rainwater is:

"Welcoming hands, imploring hands, helping hands, reaching up to the rain as glistening streams flow between those fingers.

The water courses down her arms and undulates over her body. Rivulets, brooks, creeks, streams and rivers, ponds, lakes and oceans. A body, of water".

## Dimensions of exhibit

Lifesize





*Born of the Rain*  
Hilary Clark Cole





# SDG 9 Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation

This SDG has an admirable target to facilitate sustainable and resilient infrastructure development in developing countries through enhanced financial, technological and technical support to African countries, least developed countries, landlocked developing countries and Small Island Developing States. A key objective should be to avoid the negative destructive effects which can so easily occur.

## Exhibit "The Messengers"

The exhibit is a hand built sculpture made from "resilient" Corten steel plate.

Each sculpture which Hilary works on needs to marry the material and message. When Corten steel is used to make a sculpture, it resists the corrosive effects of rain, snow, ice, fog and other meteorological conditions by forming a coating of dark brown oxidation over the metal, which inhibits deeper penetration and negates the need for painting and costly rust-prevention maintenance over the years.

As a sculptor, the message is hers to give to us, with her art. Wolves struggle for habitat with their only natural predator, Man. For Hilary, they are the messengers of the wild, reminding us that our mindless destruction of Nature must end: If we silence the wolves, we have lost it all.

"The Messengers" sends the warning regarding the negative effects of destructive infrastructure and industrialisation.

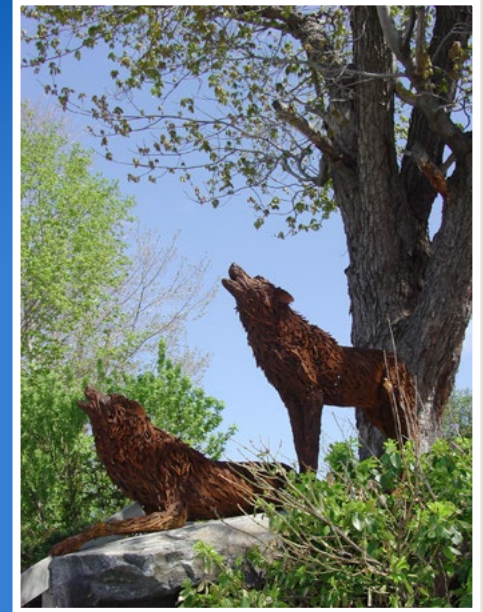
Hilary began with a skeletal structure of steel pipe and rod to establish proportions, pose and anatomical correctness. She then cut sheets of Corten steel plate using a plasma cutter into the shapes required to create the effect she wanted. For the wolves, she wanted a rumpled, loose, wild look to their coats, which required endless small shards of steel, Gas Metal Arc Welding (GMAW) welded together. Random spaces were left on the surface deliberately open to catch the light and to suggest the elusive quality of these creatures. The exhibit is mounted on a granite base.

## Dimensions of exhibit

122 cm high x 183 cm wide







*The Messengers*  
Hilary Clark Cole





# SDG 15 Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

15 LIFE ON LAND



This SDG aims to help increase financial resources to conserve and sustainably use ecosystem and biodiversity, finance and incentivize sustainable forest management, combat global poaching and trafficking. The proportion of remaining forest area, desertification and species extinction risk are example indicators of this goal.

## Exhibit "Forest Floor Quartet"

The Canadian Shield is a vast portion of North America, and its terrain varies greatly from areas of exposed rock to deep boreal forests and bogs. As nature cycles through the seasons, the changes are also distinct.

The grouping of Hilary's wall sculptures "Forest Floor Quartet" brings the hugeness of the landscape down to human scale, telling about the growing things that happen beneath our feet, a journey of discovery for our minds and hearts, and worthy of our protection.

The exhibit consists of the blues and greys of steel, the reds and pinks of copper and the yellows and bronzes of brass. The textures are achieved by hammering and hand shaping, welding and engraving.

The human component is present in each piece of the exhibit with eyes, expression and hands evident in each of them relating the viewer to nature.

Spring: the eyes look down at nurturing hands holding the first bursts of new growth. Gentle awakening.

Summer: the eyes look at you almost saucily as the hand takes a ripe blackberry to the mouth to taste. Lush abundance.

Fall: the eyes look up in wonder as the glories of Autumn pour down upon joyful reaching hands. Harvest gathering.

Winter: the eyes close in sleep under the snow, Nature at rest, peaceful, cold and quiet. Silent rejuvenation.

## Dimensions of each exhibit

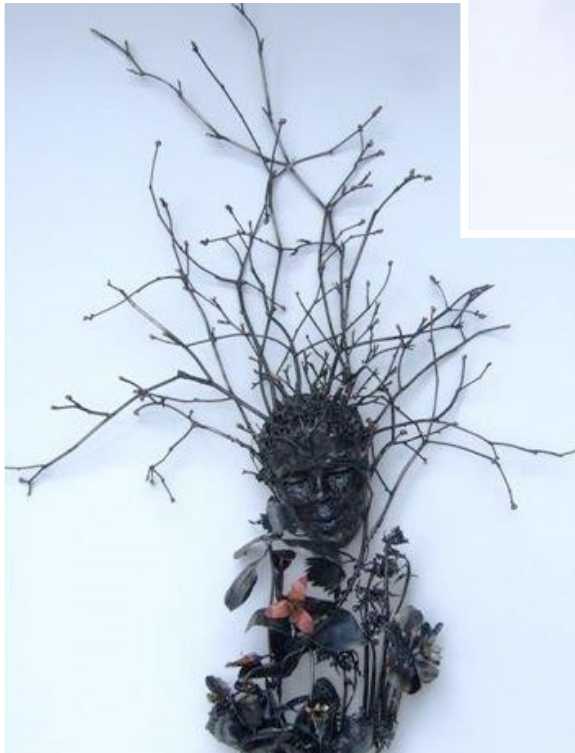
122 cms high x 76 cms wide, head and hands lifesize



*Right: Summer. A countermelody of shield ferns, luscious blackberries, blueberries, dandelion, wild iris, and day lily.*



*Right: Autumn. A crescendo of colourful maple and oak leaves, milkweed, pine branches and cones, mushroom and acorns.*



*Left: Spring. An adagio of fiddleheads, jack-in-the-pulpit, lady's slipper, budding branches of maple and beech, wild grape, coltsfoot, dog tooth violet, and trillium.*



*Left: Winter. Harmonic repose, cattails and alder in the snow.*



## Mike van Dam (Australia)

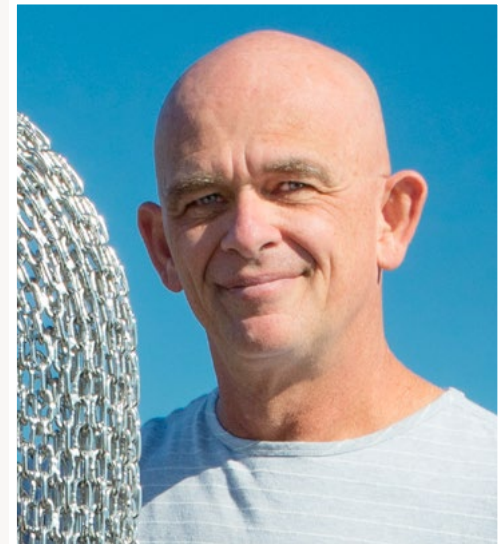
Artist and Stainless Steel Welder Mike (Michael) Van Dam was born in New Zealand and lives in Queensland, Australia with his wife and two children and is a world-renowned stainless-steel sculptor.

Mike is an award-winning and internationally recognized artist who has a strong background in creating iconic and important sculptures that have been placed all over the world and have attracted various prestigious artistic awards. Mike's sculptures have been placed in central iconic locations such as Sydney Harbour, Hayman Island, Israel and Greece.

Mike creates highly aesthetic artwork and has been mentioned as *"one of the most innovative and eminent contemporary realist and hyper-realist international artists"* by the Rarity Gallery, Mykonos, Greece.

Mike has worked on large commercial projects including, for example, high-rise handrails, boat fit-outs in stainless-steel and residential and commercial spiral staircases. Mike has previously had jobs with companies such as Stella Marine, Southern Stainless, Black Marlin Towers to name a few.

Mike is a welding expert due to his lifelong work as a Sheet Metal Worker by trade, specialising in stainless steel, and passionate about contemporary art and sculptures that deliver powerful messages. Mike's sculptures are known to not only be aesthetically pleasing and impactful, but also very durable.



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# SDG 3

## Ensure healthy lives and promote well-being for all at all ages

### 3 GOOD HEALTH AND WELL-BEING



There are many factors negatively affecting the well-being of people globally. This SDG sets out to improve all the different aspects impacting peoples' well-being. One aspect is mental health which is associated with a number of factors such as diet, exercise, stress, drug abuse, social connections and interactions, poverty, security amongst others. All of these are intimately associated with most of the SDGs. Depression and anxiety are probably the most common mental disorders.

#### Exhibit "Tearful, Stoic and Joyful"

The exhibit shows three masks, a tearful face epitomising depression and anxiety, a stoic normal everyday face and a joyful face. With the problems of poverty, hunger, illnesses, lack of water, job opportunities, shelter and safety facing so many worldwide, many millions of people wear the mask of depression and anxiety every day.

Being stoic is being calm and almost without any emotion. Stoic people endure pain or hardship without showing their feelings or complaining. As success in progressing the SDGs takes place, quality of life improves and many millions are then able to wear the joyful face.

The Masks are made from approximately 1200 metres of 4 mm 316 stainless steel chain.

Each link has four welds made by Gas Tungsten Arc Welding (GTAW) and are easy to clean and blend in well with the links.

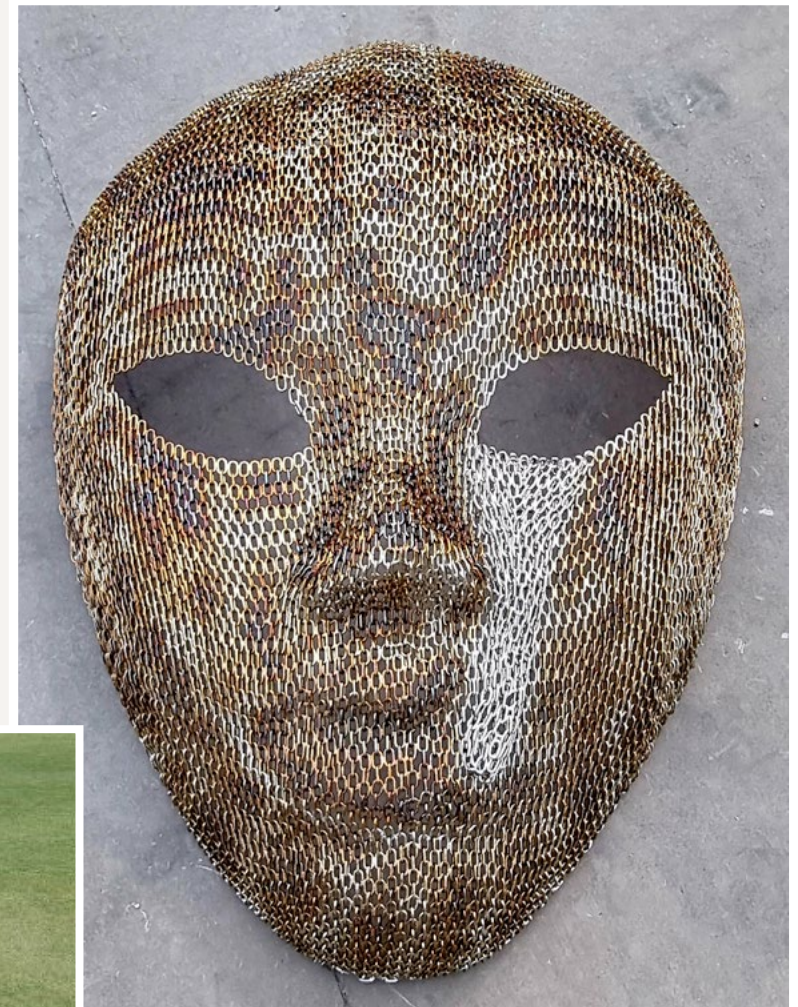
#### Dimensions of exhibit

Each Mask is approximately 160 cm high x 120 cm wide x 60 cm deep





*Stoic*  
Mike van Dam



*Tearful*



*Joyful*

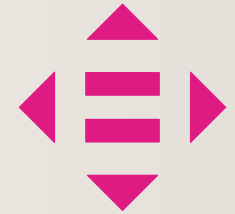




# SDG 10

## Reduce inequality within and among countries

10 REDUCED INEQUALITIES



This SDG aims to help countries reduce income inequalities, promote universal social, economic and political inclusion, ensure equal opportunities and end discrimination, adopt fiscal and social policies that promote equality, improve regulation of global financial markets and institutions, enhance representation of developing countries in financial institutions as well as introduce responsible and well-managed migration policies. This could also involve special and differential treatment for developing countries, encourage development assistance and investment in least developed countries and reduce transaction costs for migrant remittances.

### Exhibit "Helping Hands"

A key objective of the exhibit is to show that hands are ready to reach out from far and wide to help countries achieve many of the aims in the SDG. Whether governments, aid agencies, organisations and in particular individuals, there are numerous examples globally of such helping hands improving the SDGs through cooperation and collaboration, linking hands together.

"Helping Hands" is made from approximately 3000 metres of 4 mm 316 stainless steel chain.

Each link has four welds made by Gas Tungsten Arc Welding (GTAW) and are easy to clean and blend in well with the links.

### Dimensions of exhibit

350 cm high x 220 cm wide x 220 cm deep







*Helping Hands*  
Mike van Dam





## Ian Haggerty & Mike van Dam (Australia)

Ian Haggerty was born in Edinburgh, Scotland and moved to Canada in 1993 where he studied at the Dundas Valley School of Art in Ontario. He now lives on the Gold Coast in Queensland and has achieved a significant following for his sculptures particularly his steel silhouettes.

He has won numerous awards and commissions across North America, Europe and Australia. He regards his lifelike sculptures of people and animals within nature as his speciality. He works predominately in steel, resin, clay, polymer, concrete and bronze.

Artist and Stainless Steel Welder Mike (Michael) van Dam was born in New Zealand and lives in Queensland, Australia with his wife and two children and is a world-renowned stainless-steel sculptor.

Mike is a welding expert due to his lifelong work as a Sheet Metal Worker by trade, specialising in stainless steel, and passionate about contemporary art and sculptures that deliver powerful messages. Mike's sculptures are known to not only be aesthetically pleasing and impactful, but also very durable and have won various awards.

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*Ian Haggerty*



*Mike van Dam*



# SDG 13 Take urgent action to combat climate change and its impacts by regulating emissions and promoting developments in renewable energy

13 CLIMATE ACTION



This SDG covers a wide range of issues surrounding climate action. Strengthen resilience and adaptive capacity to climate-related disasters, integrate climate change measures into policies and planning, build knowledge and capacity to meet climate change and promote mechanisms to raise capacity for planning and management.

## Exhibit "Earth's Custodian"

Depicting the ravages of climate change, the "Globe of Extinction" highlights the past, present and potential extinction of species, pressing down hard on the kneeling figure's back, representing the strength required to balance our ever-demanding needs with our precious ecosystem.

This tired figure is the "protector" of our planet, for its flora, and fauna, demonstrating human responsibility that every action has either a positive or negative chain reaction. Recognising the

burden of looming extinction on its back, it depicts not only the exhaustive obligation, and delicate balance, but the necessary collaborative strength of humanity, and the need for sensitivity and proactive change

The "protector" is made from approximately 3000 metres of 6 mm 316 stainless steel chain.

Each link has four welds made by Gas Tungsten Arc Welding (GTAW) welding and are easy to clean and blend in well with the links.

The "Globe of Extinction" is made from 3 mm Corten Steel cut into 10 Pentagons and 21 Hexagons welded together by Gas Tungsten Arc Welding (GTAW) welding.

## Dimensions of exhibit

3.5 m high x 3 m wide x 2 m deep







*Earth's Custodian*  
Ian Haggerty and Mike van Dam



# Jordi Díez Fernández (Spain)

Jordi Díez Fernández was born in Valladolid on 5 March, 1966. He currently lives and works in Centelles (Barcelona). In 1989, he opened his first workshop in Fresnedillas de la Oliva (Madrid).

There, isolated for three years, he set up the sculptural concept of his work.

Figurative expression, especially the human figure, is the axis on which his work revolves. In the different stages of his career, he used all the materials of his profession: stone, iron, wood and terracotta. For Jordi Díez, these materials are the prelude to working exclusively on stainless steel, a metal in which he finds the expressive potential he needs to shape his works, leaving behind the discourse of the virtuous representation of the surface to give way to the interior, to the inner energy.

In his sculptures, he finds himself fully immersed in the presence of the hollow, the void, the deconstruction of the surface, the “less is more”. Thus, Jordi Díez uses the metal strictly necessary to imprison the air that contains the form, reaching a degree of synthesis and lightness that only enhances the expression and the feeling of being in front of a reality that underlies the tangible reality.

His work can be found all over the world in museums, temples, public areas, and private collections.

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Youtube: <https://www.youtube.com/watch?v=DnnPR0tiDxo>





# SDG 11

## Make cities and human settlements inclusive, safe, resilient and sustainable

11 SUSTAINABLE CITIES AND COMMUNITIES



Important indicators for this goal are the number of people living in urban slums, the proportion of the urban population who has convenient access to public transport, and the extent of built-up area per person.

This includes safe and affordable housing, affordable and sustainable transport systems, inclusive and sustainable urbanization, protection of the world's cultural and natural heritage, reduction of the adverse effects of natural disasters, reduction of the environmental impacts of cities and to provide access to safe and inclusive green and public spaces. This would mean having strong national and regional development planning, implementing policies for inclusion, resource efficiency, and disaster risk reduction in supporting the least developed countries in sustainable and resilient building.

One exhibit chosen highlights the vision and foresight of engineer Ildefons Cerdà for Barcelona over 150 years ago, and the second exhibit showcases two architects today in central Barcelona, all meeting the town planning objectives of this SDG.

### Exhibit "Monument to Ildefons Cerdà"

A work commissioned in 2010 by the Diputació de Barcelona through the Town Council of Centelles, the birthplace of the engineer Ildefons Cerdà, to mark the 150th anniversary of the approval of the Eixample de Barcelona Plan (the plan for the enlargement of the city of Barcelona).

In the Plan, Cerdà focused on key needs: chiefly, the need for sunlight, natural lighting and ventilation in homes (he was heavily influenced by the sanitarian movement), the need for greenery in people's surroundings, the need for effective waste disposal including good sewerage, and the need for seamless movement of people, goods, energy, and information.

His designs belie a network-oriented approach far ahead of his time. His street layout and grid plan were optimized to accommodate pedestrians, carriages, horse-drawn trams, urban railway lines (as yet unheard-of), gas supply and large-capacity sewers to prevent frequent floods without neglecting public and private gardens and other key amenities.







The monument was conceived as the first phase of a larger project intended to be installed in Plaça de Glòries, the centre that Cerdà planned for the city. In it, a colossal representation of Cerdà is dramatically fused to a sphere laden with energy, capturing a universal truth with his left hand as an antenna and casting it with vigour onto the ground, reality, with his right hand.

It is, in the words of the sculptor Jordi Díez "A mental image. What happens in Cerdà's mind when he captures the intuition of universal economy that will lead to the mosaic of octagons that he designed for Barcelona".

The monument consists of the figure of Cerdà, 280 cm high, on a spherical cap 150 cm high and 700 cm in diameter, located at the roundabout where the main access to the town of Centelles ends. It is made entirely of AISI 316L stainless steel.

### Exhibit "The Two Architects"

Work commissioned by Unibail-Rodamco as a tribute to the architects Carlos Martínez and Jos Galán for the inauguration of the Glòries Shopping Center, in which both collaborated in a decisive way, under the slogan "25 years projecting Glòries and the new centrality of Barcelona". The objective of the sculptor Jordi Díez for this artwork is expressed in one of his statements: "From the first moment I undertook this work I captured the deep human quality of Carlos and Jos, two hard-working, family men enthusiastic about the transcendence of their work for many people".

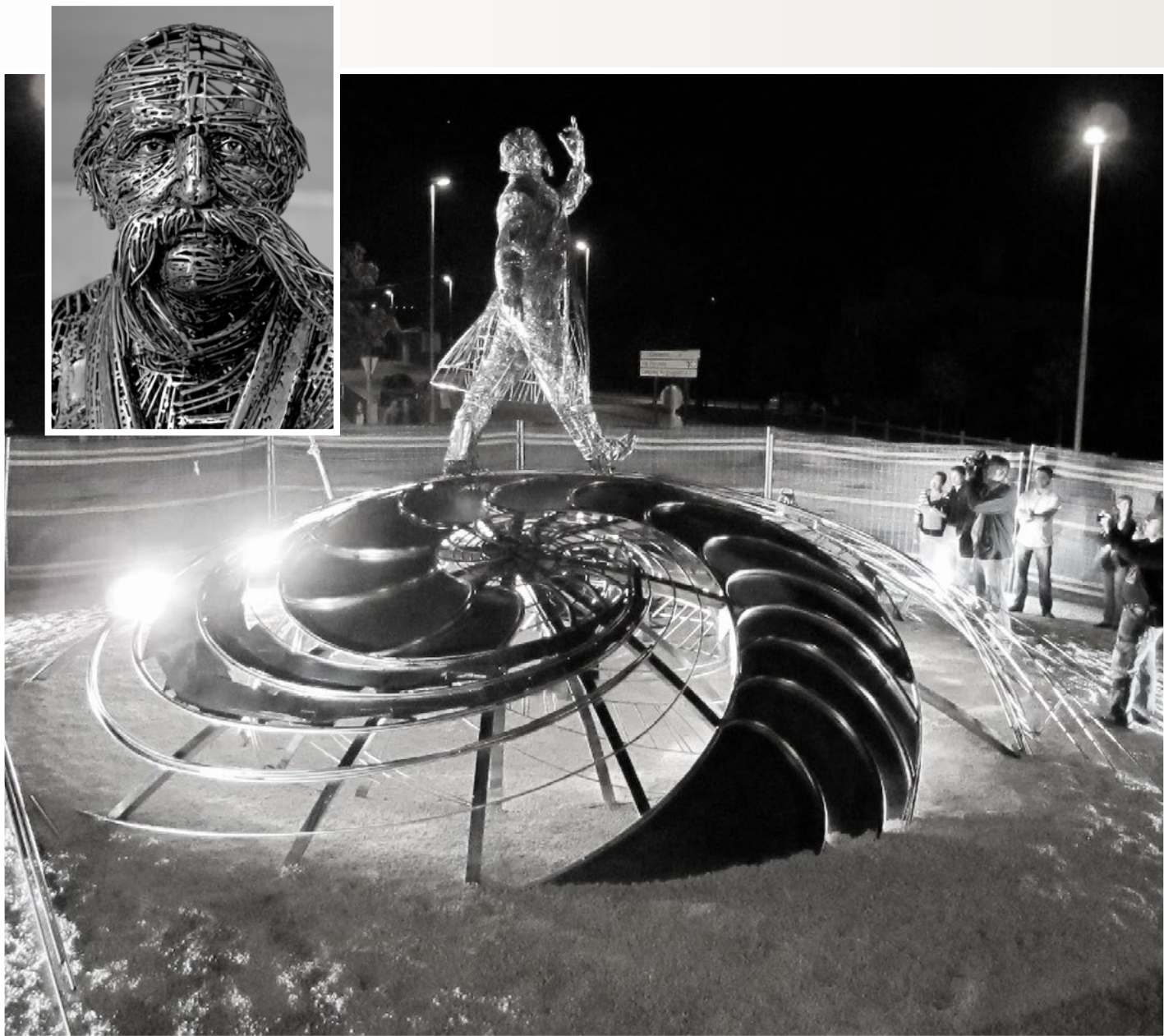
The monument is composed of the two fragmented life-size figures of Carlos and Jos, suspended with steel cables from a cubic structure 250 cm high by 150 cm wide and 150 cm deep, all made of AISI 316L stainless steel.

The sculpture was oriented in such a way that the two figures focus their attention on a building, the modification of which they worked closely together on.



It was unveiled in 2017 at the inauguration of the Glòries Shopping Center in front of family, friends, and collaborators in a solemn and emotional act.

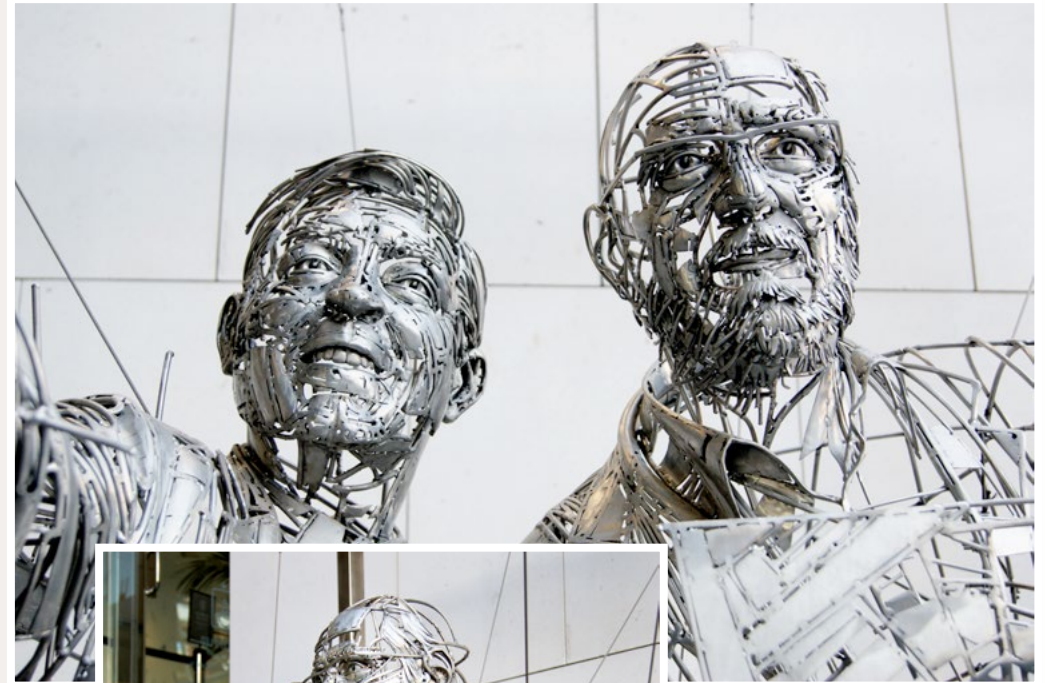
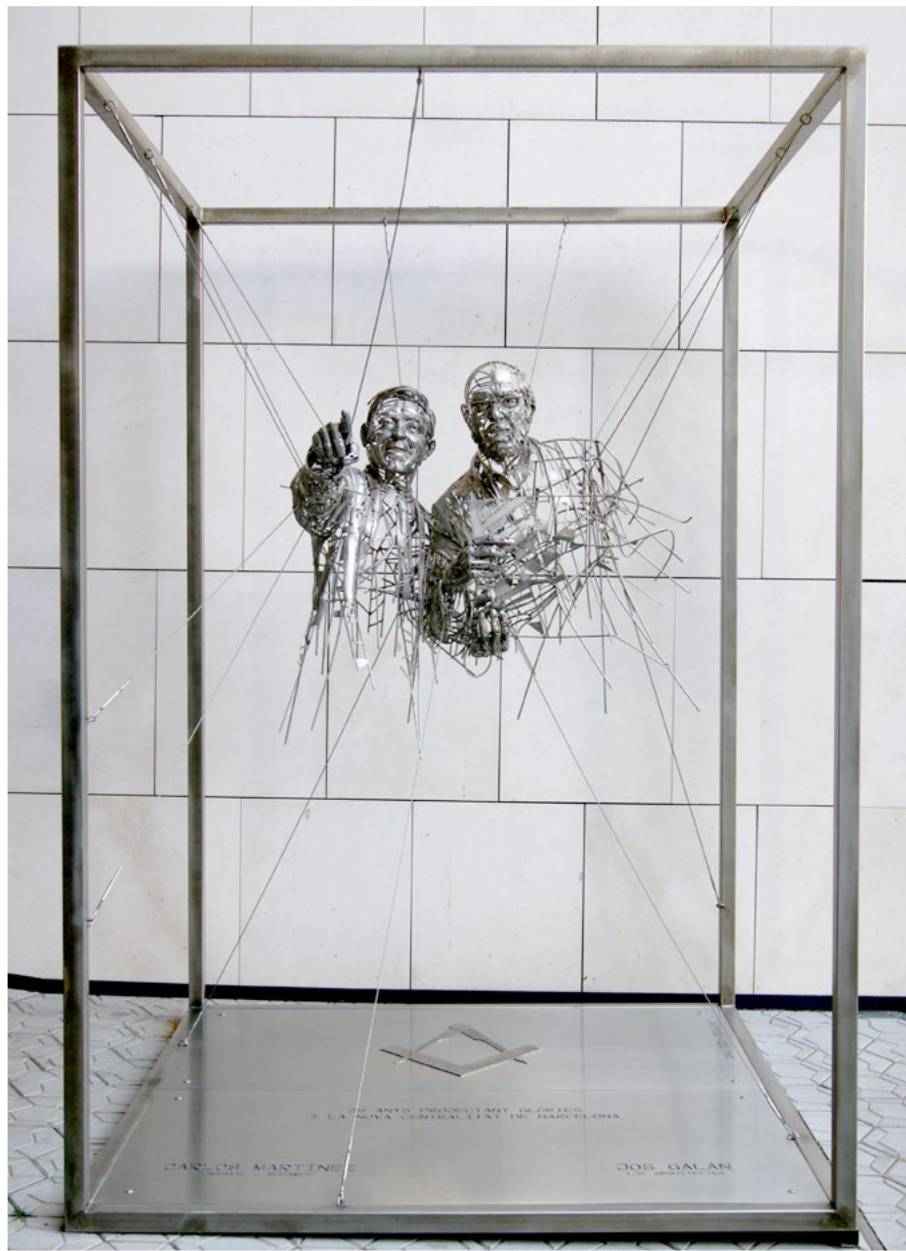




*Monument to Ildefons Cerdà*  
Jordi Díez Fernández







*The Two Architects*  
Jordi Díez Fernández





## Ricard Mira (Spain)

Ricard Mira was born in 1952. He learned to weld while working at the Derbi motorcycle company, where later on he became a fitter for the motorcycles which won the World Championship repeatedly. Creating welded art serves him as a complementary therapy for overcoming schizophrenia.

Although he also uses other metals (such as stainless steel, copper, brass and aluminum), he makes most of his sculptures by recycling iron scrap from the metalworking industry at Martorelles (near Barcelona, Catalonia), where he lives and works. He often uses Corten steel too, especially for public sculptures, since it gives them an interesting finish. He was named a Master Sculptor by the Government of Catalonia in 2014 and is a member of ICRE <<https://icre.cat/>> (Catalan Institute for Research in Sculpture).

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# SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

4 QUALITY EDUCATION



This SDG has targets which include: free primary and secondary education, equal access to quality pre-primary education, affordable technical, vocational and higher education, increased number of people with relevant skills for financial success, elimination of all discrimination in education, universal literacy and numeracy, and education for sustainable development and global citizenship.

In all countries, education is a key activity to help people to get out of poverty. Promoting education and training which results in credible personnel qualifications and certifications, which should also be portable both within a country and overseas, as well as being recognised on an international basis, is important to help people obtain work and develop careers.

Notwithstanding the above, in many developing countries, regional disparities can be significant in terms of children being able to read and write. Much of this is attributed to poor attendance levels at school and leads on to the meagre participation of youth and adults in formal and non-formal education and training. A major challenge is to improve participation in education at all levels substantially.

## Exhibit "Spring of Knowledge"

This is a sculpture made of cut, machined, welded, primer-painted and black-paint-finished iron and representing a life-sized child who is drinking from a fountain flowing from a book, symbolizing education at school. It is located outside the entrance to the Simeó Rabasa School at Martorelles (Barcelona).

Developed countries can play a key role in assisting developing countries implement projects which could easily lead to improving lifelong learning. These include efficient and economical education and training via upgrading of schools and educational facilities, modern training course resources, remote training, education and examination methods, inexpensive virtual reality training, grants, scholarships and career opportunities for a diverse range of people.

## Dimensions of exhibit

200 cm high x 60 cm wide x 100 cm deep







*Spring of Knowledge*  
Ricard Mira





# SDG 5

## Achieve gender equality and empower all women and girls

5 GENDER  
EQUALITY



Through the pledge to “Leave No One Behind”, countries have committed to fast-track progress for those furthest behind, first. SDG 5 aims to grant women and girls equal rights, opportunities to live free without discrimination including workplace discrimination or any violence. This is to achieve gender equality and empower all women and girls.

### Exhibit “Monument to Working Women”

The exhibit represents a woman watering a furrowed field. Although Ricard usually works with iron, this exhibit is made of cut, machined and welded recycled brass. He based it on his recalling of a childhood friend’s grandmother who was a farmer and often worked in her plot. She used to divert the flow of water by doing and undoing ridges with her hoe, and that activity is what the sculpture represents. Since its inauguration in 1996 it was fittingly located in the pond of the Carrencà farmhouse, a public place at Martorelles (Barcelona), and served as a fountain. After having been renovated by its artist, it awaits a new location now that the pond no longer exists.

In many regions of the world, collecting water is primarily the responsibility of women whose lives are further impacted by lack of water and sanitation because they are responsible for the care of children, who are affected by diarrheal diseases. Furthermore, in some nations, 50% of girls drop out of school due to lack of toilets. In Bangladesh, it was shown that the provision of microcredit loans to women increased the presence of latrines in their households from 9% to 26%.

Unfortunately in many developing countries, basic finance is a major impediment to women progressing. A good example of overcoming this however is that of the Indian government which has enabled new avenues of credit, insurance and Direct Benefit Transfers to the poor, including to over 200 million women, thereby accelerating their economic empowerment which can lead to pursuing opportunities in welding related fields as well as others.

### Dimensions of exhibit

60 cm high x 40 cm square





*Monument to Working Women*  
Ricard Mira

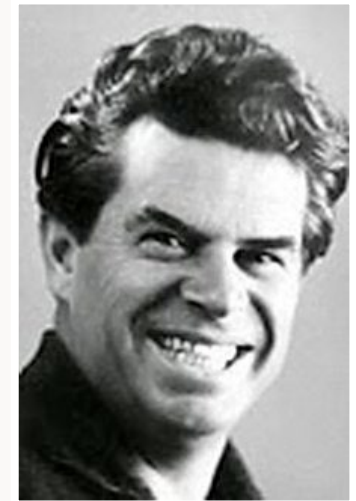


## Victor Ivanoff (South Africa)

Victor Ivanoff (11 January, 1909 Vilnius, Russia – 1 February, 1997 Johannesburg, South Africa), the son of a Russian Cossack general, was a South African artist, cartoonist and singer. Victor Ivanoff joined the Don Cossack Choir on their world tour which included visiting South Africa in 1936. Africa appealed to Ivanoff and he stayed on.

He found work as a cartoonist at the Afrikaans newspaper in Johannesburg, Die Vaderland, a position he held for 37 years. During this time he created more than 12,000 cartoons, but his dream of being considered a serious artist saw him signing up for art lessons from Pierneef, the celebrated South African Artist, and a study trip to Europe.

Working in oils and sepia tint, he produced mainly landscapes, people and animals, and took part in some joint exhibitions and ten solo exhibitions in the Transvaal.



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# SDG 12

## Ensure sustainable consumption and production patterns

12 RESPONSIBLE CONSUMPTION AND PRODUCTION



This SDG is meant to ensure good use of resources, improving energy efficiency, sustainable infrastructure, and providing access to basic services, green and decent jobs and ensuring a better quality of life for all.

The steel producing industry has introduced a ResponsibleSteel™ certification programme and four steelmakers in the world have now achieved certification. The Responsible Steel™ Standard covers a range of environmental, social and governance (ESG) criteria including occupational health and safety, environmental aspects-air emissions, noise, water stewardship, waste and biodiversity, human rights and labour rights, climate change and greenhouse gas emissions, stakeholder engagement, local communities, and communications.

### Exhibit “Welded Wall Murals of Steel-making”

Victor’s welded murals, currently housed at the Southern African Institute of Welding (SAIW) in Johannesburg, South Africa, were initially commissioned for the ISCOR Headquarters in Pretoria. ISCOR was the major steel making company in South Africa.

Although only two examples are shown, the range of murals produced depicted many of the operational stages in a steelworks. The murals were later broken up and donated to the SAIW, where they are currently displayed in a non-sequential narrative throughout its Johannesburg building.

Steel is a significant part of any developing economy and is at the core of a green economy, in which economic growth and environmental responsibility work hand in hand. Once the steel is produced it becomes a permanent resource because it is 100% recyclable without loss of quality and has a potentially endless life cycle.

### Dimensions of each exhibit

160 cm high x 220 cm wide





*Welded Wall Murals of Steel-making*  
Victor Ivanoff



# Nedim Hadži Ahmetović Mafa (Serbia)

Iron processing is the core of most of Nedim's monumental and gallery size works. He has staged 17 juried solo exhibitions, and over 40 international collective exhibitions, and executed about 80 monumental public sculptures in 23 countries worldwide, mostly in metal. He recently started teaching iron and wood processing at Art University.

Nedim believes that the concern about sustainability is something new, an agenda which comes following the extreme, exponential growth of population and rapid technological development. In other words, there was no need for such concern on the level which is highlighted today.

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# SDG 2 End hunger, achieve food security and improved nutrition, and promote sustainable agriculture

2 ZERO HUNGER



A key 2030 target of this SDG is to ensure sustainable food production systems and implement resilient agricultural practices which increase productivity and production, help maintain ecosystems, strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters, and which progressively improve land and soil quality.

## Exhibit "Digital cloud over summer house on the mulberry tree"

In the exhibit, the summer house on the tree is something which belongs to Nedim's generation, growing up without computers and mobile phones in a social and cultural background which still nurtured relatively normal relationships with nature, meaning, the summer house represents the idealistic, nostalgic fairy-tale of the natural sustainability of prior generations.

In general, the symbolism of a house should reflect security, protection, a safe zone, but that dream house and its properties and values are long gone

On the other hand, the digital cloud metaphorically stands for everything which is new: media, internet, satellite network over our planet and new technologies which are our only hope of balancing and saving, better preserving, and better handling of resources particularly related to food security, thus creating a better world for those living in conditions of malnutrition, poverty etc.

Gas Metal Arc Welding (GMAW) was used. Material thicknesses ranged from 1.6 mm to 2 mm thick steel sheet, 6.5 mm for the trunk with 3.5 mm diameter welding wire used as branches. Surface finish is a result of the heated colouration of the welding process and is protected by opaque transparent acrylic coating which gave the branches a bronze-like colouration. The tree trunk and the base were treated with Tannic acid for the effect of deep black coloration.

## Dimensions of exhibit

52 cm high x 38 cm wide x 29 cm deep





*Digital cloud over summer house on the mulberry tree*  
Nedim Hadži Ahmetović Mafa



# Niteck Youtou Mouloum (Cameroon)

Niteck Youtou Mouloum was born in 1982 in Edea, Cameroon and is a graduate of the Lycée Technique d'Edea (Technical High School of Edea) in mechanical and welded construction. He has lived and worked in Yaoundé since 1986 and is an experienced qualified SMAW welder.

He is a strong role model in the Cameroon welders community particularly due to his promotion of Cameroonian culture through his works of art. He has created a significant number of private sculptures over the years.

He has won various awards for his sculptures and he has been profiled on television programs on the FIMS International Forum of Welding Professions in Africa, organized by Petroleum Certification Consulting and Cameroon Welding Association.

Steel is a significant part of any developing economy and is at the core of a green economy, in which economic growth and environmental responsibility work hand in hand. Once the steel is produced it becomes a permanent resource because it is 100% recyclable without loss of quality and has a potentially endless life cycle. The use of steel scrap in his sculptures shows his belief in the concept of reuse, reduce and recycle.



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# SDG 12

## Ensure sustainable consumption and production patterns

12 RESPONSIBLE CONSUMPTION AND PRODUCTION



This Goal encourages people to achieve the environmentally sound management of all wastes throughout their life cycle, reducing waste generation through prevention, reduction, recycling and reuse, encourage companies to adopt sustainable practices, promote public procurement practices that are sustainable, and ensure that people everywhere have the relevant information and awareness for sustainable development.

### Exhibit "Awakening of the ancestors"

In 2018, Niteck was commissioned by the BASSA community of Cameroon to create an ancestral memorial called "Awakening of the ancestors" for the transmission of messages to the ancestors.

The tam-tam is an idiophone musical instrument, from the percussion family. To produce a sound, it must be struck with the

hands or a mallet. It differs from the gong, because it emits an indeterminate sound.

The artist's preparation involved several sessions of participating in traditional dance ceremonies with this type of tam-tam, usually made from animal skins.

The body of the tam-tam is made of recycled steel motorcycle chains welded by Shielded Metal Arc Welding (SMAW). The top is made of 2 mm light sheet steel, with a body filler mastic treatment to give it a protective coating to prevent corrosion, abrasion and improve scratch resistance.

### Dimensions of exhibit

90 cm high x 45 cm dia.





*Awakening of the ancestors*  
Niteck Youtou Mouloum



# Bogdan Constantin Nueleanu (Romania)

Bogdan was born in 1978 in Romania and graduated from the Faculty of Arts and Design, Timisoara, in Visual Arts in 2010 and in 2015 as a Master Sculptor. As a career artist, he has been involved in a wide range of successful activities with international exposure including participating in over 60 group exhibitions, eight personal exhibitions, seven workshops, 13 Symposia, six judging panels as well as receiving six major prizes and awards.

Attracted by the chromatic valences it possesses, Bogdan works primarily with bronze sometimes welding it with other metals like stainless steel. His sculptures are futuristic, post-apocalyptic structures that seem to have been plucked out of a different dimension.

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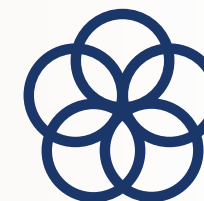
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# SDG 17 Strengthen the means of implementation and revitalize the global partnership for sustainable development

17 PARTNERSHIPS FOR THE GOALS



This SDG is about “partnerships for the goals”. It refers to the need for non-hegemonic and fair cross-sector and cross-country collaborations in pursuit of all the goals by the year 2030. It is a call for countries to align policies and is a vision for improved and more equitable trade, as well as coordinated investment initiatives to promote sustainable development across borders. It is about strengthening and streamlining cooperation between nation-states, both developed and developing, using the SDGs as a shared framework and a shared vision for defining that collaborative way forward.

## Exhibit “Hot Composition”

The exhibit is related to the changing state of the current general situation that the whole world is going through. Through the welding community and welded art, such “partnerships for the goals” can be encouraged, leading to greater cooperation and collaboration and increased stability rather than turmoil in the world.

The artwork made from stainless steel, with an obviously abstract character, is born from the desire to create a composition through which to highlight the hidden chromaticism that stainless steel possesses, but also to transpose in sculptural language the fluid state through which all things pass at some point.

This way the composition is born, which besides the qualities of an abstract work also presents a new type of artistic expression, specific to the artist, namely this type of dripping in texture through which the composition takes shape and ends centered on a granite plinth.

The work is made of stainless steel by the technique of welding with covered electrodes keeping a circular shape through which nature is discovered, the circle being the essence of all things.

## Dimensions of exhibit

65 cm high x 60 cm wide x 15 cm deep





*Hot Composition*  
Bogdan Constantin Nueleanu



# Ivana Radovanovic (Montenegro)

Ivana obtained an MA in sculpture from the Faculty of Fine Arts in Cetinje in 2009 and her PhD from the Faculty of Fine Arts in Belgrade in 2016. She is an assistant professor at the University of Montenegro, Faculty of Fine Arts in Cetinje. As a Fulbright scholar, she completed a postdoctoral research programme at St. John's University in New York and as an artist-in-residence, she was selected for the Fulbright "Silvermine" program in Connecticut, USA (2019).

She has exhibited independently in America, Austria, Italy, Montenegro and Serbia. She has participated in residency, educational and artistic programmes in Austria, the Czech Republic, Croatia, Portugal, Finland, Greece, Slovakia, Bulgaria and other countries as well as winning several significant awards during her career.

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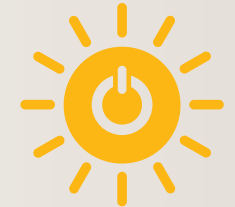
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# SDG 7 Ensure access to affordable, reliable, sustainable and modern energy for all

7 AFFORDABLE AND CLEAN ENERGY



This Goal aims to improve the percentage of a population with access to electricity as well as the renewable energy share and energy efficiency.

This includes universal access to modern affordable and reliable energy, increasing global percentage of renewable energy, doubling the improvement in energy efficiency as well as promoting access to research, technology and investments in clean energy infrastructure, and expanding and upgrading energy services for developing countries.

## Exhibit "Obelisk – Prayer For Lost Objects"

The sun has extremely important influences on our planet and plays an important role in the need for energy. People love the sun and truly appreciate that without the sun there would be no life on earth.

The piece entitled "Obelisk-Prayer For Lost Objects" used to present her work as part of the international project "Floating Gravities", situated in the area of the Smederevo Fortress, was created by joining sheets of metal in the shape of an obelisk.

The project was launched in May-June, 2022 in cooperation with the company HBIS GROUP Serbia in Smederevo. Ten artists

gathered under a unique concept of creating sculptures with the objective of strengthening, supporting and encouraging the development of cultural cooperation between Serbia, China and Montenegro.

Obelisk is a symbol of the Sun, and resembles the historical cult of the raised stone on which the Sun "rests" upon sunset, personifying the upright prayer book that connects heaven and earth. The exhibit was created by joining sheets of metal in the shape of an obelisk.

Following the framework of Ivana's typical work through form, the metal plates are joined into a recognizable sculptural figure, which is then left to the course of time to further develop in its evolving, dynamic and variable existence.

The poetics of the work is based on the fact that the processual degradation of the material oscillates minimally, but that the product is subsequently challenged through different ambient conditions in which the sculpture is positioned.

## Dimensions of exhibit

213 cm high x 32 cm square





*Obelisk – Prayer For Lost Objects*  
Ivana Radovanovic

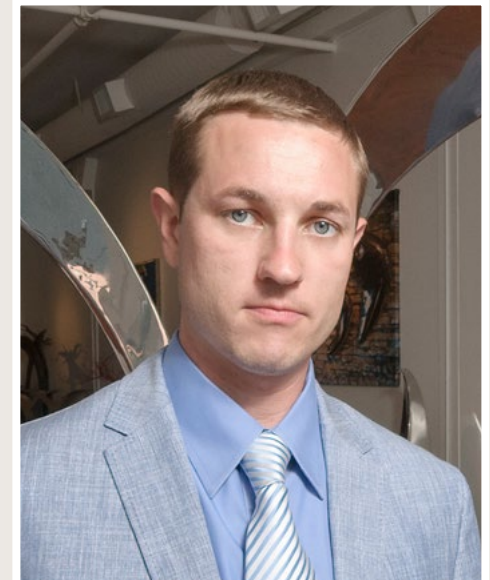


## Ryan Schmidt (USA)

Ryan Schmidt is an American Artist from Arkansas sculpting in stainless steel since 2002. He has participated in over 50 group shows and exhibitions, has a variety of exhibits on permanent public display and has received awards with his work now featured all across the world with art lovers intrigued by how such sculptures are made.

He currently resides in Scottsdale, Arizona where he participates, works and maintains a studio space during Celebration of Fine Art from January through March. You can also see some of his work at his Art Gallery located at Schmidt Gallerie in Bridgewater Place Building, Grand Rapids, Michigan, USA.

Ryan's artistic statement has evolved from combining water fountains and stainless steel sculptures into the landscaped environment to create atmospheric sculptures in fluid uplifting movement. The changing reflections of the sun, water, clouds, and the seasons around the sculpture invokes the viewer's imagination for inspiration of great healing and thoughtfulness. This concept also represents supporting local engagement in water and movement to protect and restore water-related ecosystems so critical to this SDG.



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# SDG 6 Ensure availability and sustainable management of water and sanitation for all

6 CLEAN WATER AND SANITATION



This SDG aims to help to expand water and sanitation support to developing countries, and to support local engagement in water and sanitation management. This will include safe and affordable drinking water, end open defecation and provide access to sanitation and hygiene, improve water quality, wastewater treatment and safe reuse, increase water use efficiency and ensure freshwater supplies, implement Industrial Waste Management Evaluation, protect and restore water-related ecosystems.

## Exhibit "Thirst"

The Thirst sculpture is permanently located in the City of Hot Springs, Arkansas, at the Hot Springs Creek Greenway Sculpture Garden.

The techniques employed in the creation include forming the sculptural shape by tacking the sheet using clamps and tools to weld the forms and manipulate the metal into the shape he desires. The material used is Type-316L Stainless Steel. The thickness of material is 10 and 11 gauge to minimize warps as he pushes those tensions.

All joints are fully welded to maximize strength before grinding and sanding. His preferred finish is mirror-polish, which ensures the reflective surface will withstand both external and internal elements to retain the mirror finish as the day it was made.

## Dimensions of exhibit

2.44 m high x 1.22 m wide x 0.61 m deep





*Thirst*  
Ryan Schmidt



# Hobby Artists

**Welded art can become a very satisfying hobby. A hobby can be a regular activity that is done for enjoyment, typically during one's leisure time. Examples in the IIW 2023 Digital Collection can be seen showcasing casual, serious and project based leisure across the range of SDGs.**

There are very good examples of career artists starting as hobby artists and as their competencies and experiences grow, opportunities arise which enable them to move into a full time role as a career artist.

In this Category, five artists are shown.

**SDG 14** Exhibit: Manta Ray. Artist: Patrick Knighton (Australia).

**SDG 14** Exhibit: Starry Sturgeon. Artist: Andrey Makhorin (Kazakhstan).

**SDG 17** Exhibit: To the Future. Artist: Sergey Minakov (Ukraine).

**SDG 10** Exhibit: Weld Equality. Artist: Jackie Morris (Canada).

**SDG 8** Exhibit: Kong. Artist: Jennifer Phillips (Canada).

All five artists come from a welding background using their knowledge and skills to both contribute to each country's National Welding Capability and progress the Sustainable Development Goals.

Jennifer Phillips has made such a move recently from a highly qualified and certified Canadian Red Seal welder working on projects in industry to starting her own full time business in welded art, Metal Monkey Design Co.





# Patrick Knighton (Australia)

At 22, Patrick took up an apprenticeship in light fabrication as he'd always dreamt of building a hot-rod. However, since learning his trade, not only did it ignite his passion for welding, it fuelled his desire to create and sculpt. At 35, Patrick runs his own Perth based company Deadbeat Fabrication which is demanding and time consuming. To take his mind off the stress of day-to-day life, Patrick enjoys crafting various forms of wildlife as it's the perfect way to evolve his metal sculpting skills, with the freedom to create and highlight the biodiversity of Western Australia.

Manta Rays are a great source of inspiration for him. Described as a gentle giant of the sea, they are graceful, saucer-like creatures being extremely agile and able to move at rapid speed while often breaching the water in spectacular fashion. Being a filter feeder, a Manta Ray strains water through its gills as it swims. It often glides in vertical loops during meal times which might be to concentrate plankton numbers for greater feeding efficiency.

## Contact Info

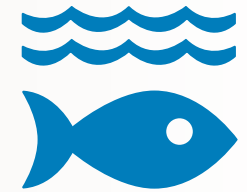
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# SDG 14 Conserve and sustainably use the oceans, seas and marine resources for sustainable development

14 LIFE BELOW WATER



This SDG aims to reduce marine pollution, protect and restore ecosystems, reduce ocean acidification, create sustainable fishing, conserve coastal and marine areas, end subsidies contributing to overfishing and increase the economic benefits from sustainable use of marine resources.

## Exhibit "Manta Ray"

Manta Rays are found in tropical waters throughout the world. In certain cultures they are valued for their properties in traditional medicine which has led to unsustainable fishing practices in developing countries within Africa and South East Asia and the International Union for Conservation of Nature (IUCN) has listed them as "vulnerable to extinction".

The Manta Ray sculpture is designed with interlocking bases, so they may be displayed as a pair, or individually. Each Manta Ray has a wingspan of 33 cm and a length of 27 cm, with the set together measuring around 50 cm wide by 33 cm high. They are made by cold forging, sheet metal shaping and Gas Metal Arc Welding (GMAW), their colours have been achieved with heat, and they both feature a set of internal gill rakers inside their open mouths.

They are sculpted swimming over an oxy-cut steel reef, with their fins positioned in a way to show they are both feeding. The cephalic fins protrude from their head and can roll out to guide plankton into their complex system of traps, filters and gill rakers.

## Dimensions of exhibit

33 cm high x 50 cm wide x 27 cm long





**Manta Ray**  
Patrick Knighton





# Andrey Makhorin (Kazakhstan)

Andrey is from Atyrau, western part of Kazakhstan. He was born on 19 February, 1981. He is a professional welder and is very proud of it and has been working in the big company KazTransOil for more than 20 years.

Andrey likes drawing, music, fishing and sports. He began to be fond of welding at the age of 16 helping his uncle in the garage before going to the welding college and graduating with honours. Andrey has taken part in many welding competitions such as “The Best in the Profession” and “Arc Cup” amongst others. He has received more than 20 winner certificates.

Knowing how to draw and weld, Andrey began to combine them together and began to make various crafts from scrap metal including electrode stubs. He likes working with metal very much, making his ideas come true. It's very cool. He participated in the IIW 2021 Digital Collection with his exhibit “Metallica”.

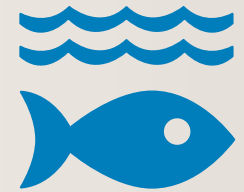
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# SDG 14 Conserve and sustainably use the oceans, seas and marine resources for sustainable development

14 LIFE BELOW WATER



This SDG aims to reduce marine pollution, protect and restore ecosystems, reduce ocean acidification, create sustainable fishing, conserve coastal and marine areas, end subsidies contributing to overfishing and increase the economic benefits from sustainable use of marine resources.

## Exhibit "Starry Sturgeon"

The starry sturgeon, *Acipenser stellatus*, also known as stellate sturgeon, is considered critically endangered by the International Union for Conservation of Nature (IUCN) and international trade in this species is restricted by The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). It is an anadromous species, which migrates up rivers to spawn. It reaches 220 cm in length and weighs up to 80 kg. The maximum reported age for this species is 27 years. It is a harmless species that feeds

on fish, worms, crustaceans and mollusks and is one of the three most important species for caviar along with the Beluga sturgeon and the Persian sturgeon. Its flesh is considered an expensive delicacy in the Caspian region.

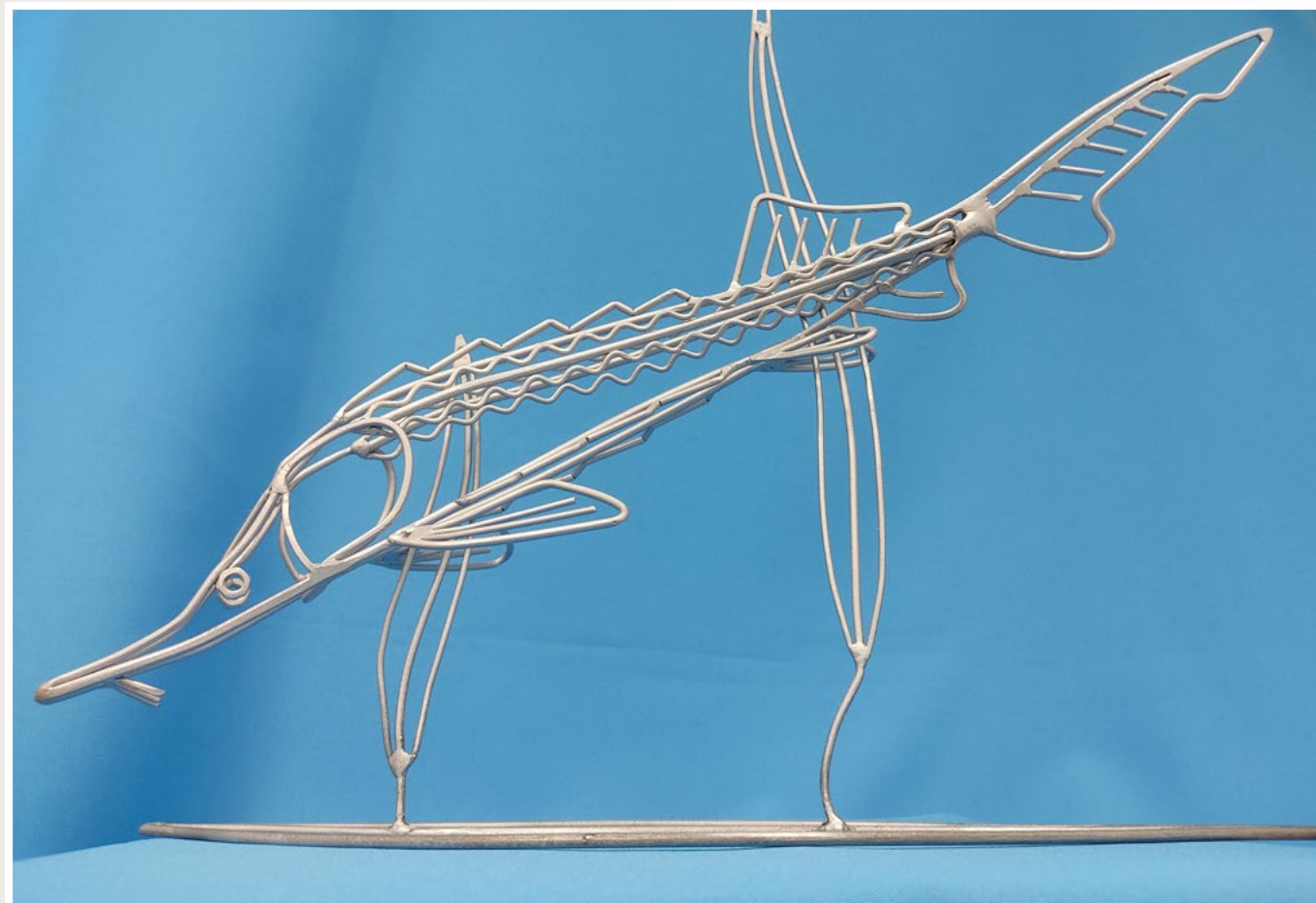
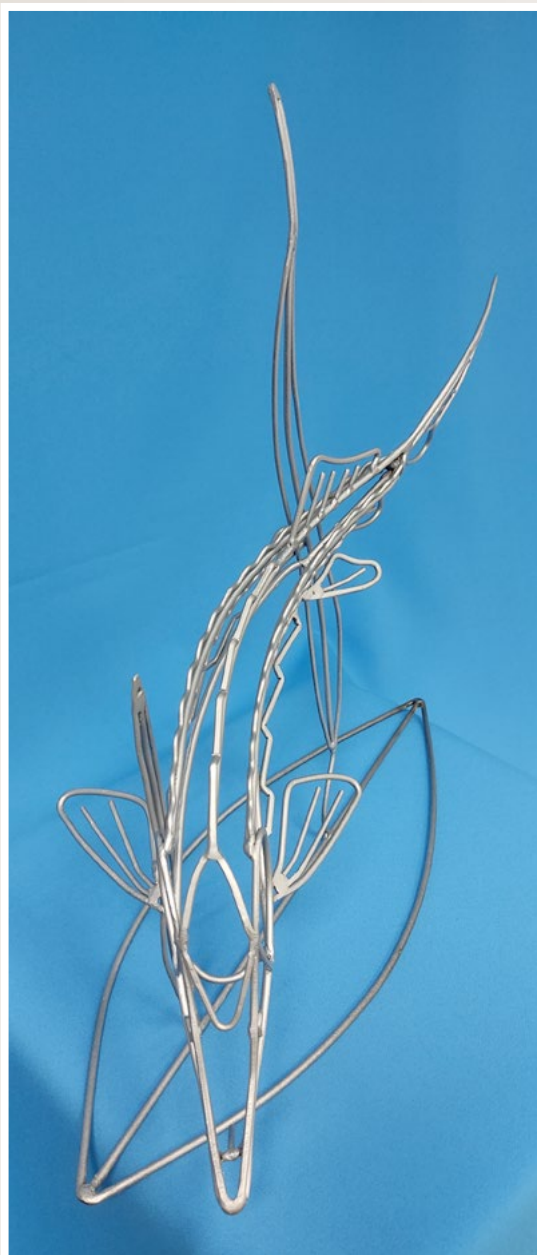
The starry sturgeon is an endangered species of fish in the Caspian Sea particularly due to overfishing. Andrey made this exhibit as a symbol of respect for nature and the environment.

The exhibit is made of electrode stubs. On a similar basis to many artists, he is adept at converting scrap into valuable art pieces as an innovative way to show concern for the environment encouraging people to reuse, reduce and recycle.

## Dimensions of exhibit

40 cm high x 50 cm wide





**Starry Sturgeon**  
Andrey Makhorin





## Sergey Minakov (Ukraine)

Sergey has creatively combined both his professional activity in welding and his hobby of welded art and photography. Welding gave him the opportunity to master different types of metal joining and cutting while photography gave him the skills to capture a moment that carries a powerful energy when people plunge into the space of feelings, forgetting about everything else.

Turning the photography into a welded sculpture takes that fleeting moment and turns it into years. Even though this transfer from photography may sometimes mean the loss of feeling of individuality, the range of feelings remain.

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Welded sculpture TO THE FUTURE!



# SDG 17 Strengthen the means of implementation and revitalize the global partnership for sustainable development

17 PARTNERSHIPS FOR THE GOALS



This SDG is a vision for improved and more equitable trade, as well as coordinated investment initiatives to promote sustainable development across borders. It is about strengthening and streamlining cooperation between nation-states, both developed and developing, using the SDGs as a shared framework and a shared vision for defining that collaborative way forward.

## Exhibit "To The Future!"

Young people can reach out to other young people globally and strengthen the means of implementation of sustainable development through greater international cooperation and collaboration which is seen as vital to achieving all the other SDGs.

The welded sculpture "To The Future!" symbolises the path to happiness for the future of the young generation and the planet in developing multi-stakeholder partnerships to share knowledge, expertise, technology and financial support critical to the overall success of the SDGs.

The main structural elements of the sculpture are a ring made of double-T profile, figures of a young man and a girl in the middle and a globe, a base and stiffness elements behind the ring. The globe represents the limitless opportunities for young people in their future life and walking hand-in-hand signifies partnership. Welding technologies used included TIG (141) braze welding with CuSi3 solder (figures, globe), MAG (135) welding (connecting the figures and the globe to the shelf of double-T profile (rings with a diameter of 2.3 m), welding of the ring sections, stiffness element for the ring (bent pipe 40 x 20 mm) and MMA (111) welding of the base (channel profile 60 mm high) connection with the ring.

## Dimensions of exhibit

2.3 m high x 2.3 m wide x 1.5 m deep





*To The Future!*  
Sergey Minakov





## Jackie Morris (Canada)

Jackie is a welding technologist with involvement in training in welding skills at Conestoga College of Technology and Advanced Learning in Ontario, promoting careers in welding to a diverse range of people. Between inspiring future tradesmen and running one of the College's many welding sites, she enjoys creating welded art.

In 2018, she was named a YWCA Woman of Distinction in recognition of her role as an educator and mentor to women, trail-blazing in trades and technology, sharing opportunities to help equality transition through industry.

To reduce inequality within and among countries, the global welding industry can make a significant contribution to achieving SDG 10. Improving a country's National Welding Capability (NWC) can make a significant contribution to, and have a very positive effect on, many national and international programmes including the SDGs.

As members of the welding industry, we all have the opportunity to design and engineer our future to contribute to achieve the SDGs. By bringing available welding resources to assist in improving the NWCs and SDGs in each country, we can have a remarkable positive effect globally.

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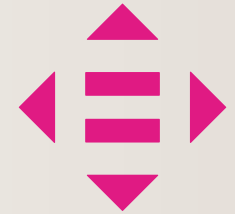
Website/Blog: [JEMsMind.com](https://JEMsMind.com)



# SDG 10

## Reduce inequality within and among countries

10 REDUCED INEQUALITIES



This SDG aims to help countries reduce income inequalities, promote universal social, economic and political inclusion, ensure equal opportunities and end discrimination, adopt fiscal and social policies that promote equality, improve regulation of global financial markets and institutions, enhance representation of developing countries in financial institutions as well as introduce responsible and well-managed migration policies. This could also involve special and differential treatment for developing countries, encourage development assistance and investment in least developed countries and reduce transaction costs for migrant remittances.

### Exhibit “Weld Equality”

This play on words, towards World Equality through the Welding Industry. The concept of the exhibit is an abstract worldview with a title block, as part of an overall engineering global plan, to improve the national welding capabilities and standards of all countries. To improve equality and quality on multiple levels of life, for people and infrastructure.

Such a global plan will provide unique cooperative and collaborative platforms for experts, practitioners and policy makers in the welding and related industries to share not only technical information and innovation, but knowhow in all areas affecting a country’s ability to achieve sustainable development in a sustainable environment and fulfil their responsibilities in a cooperative and converging global community.

### Materials

Reclaimed steel sheet, bar, transmission components and filler rod.

### Processing applications

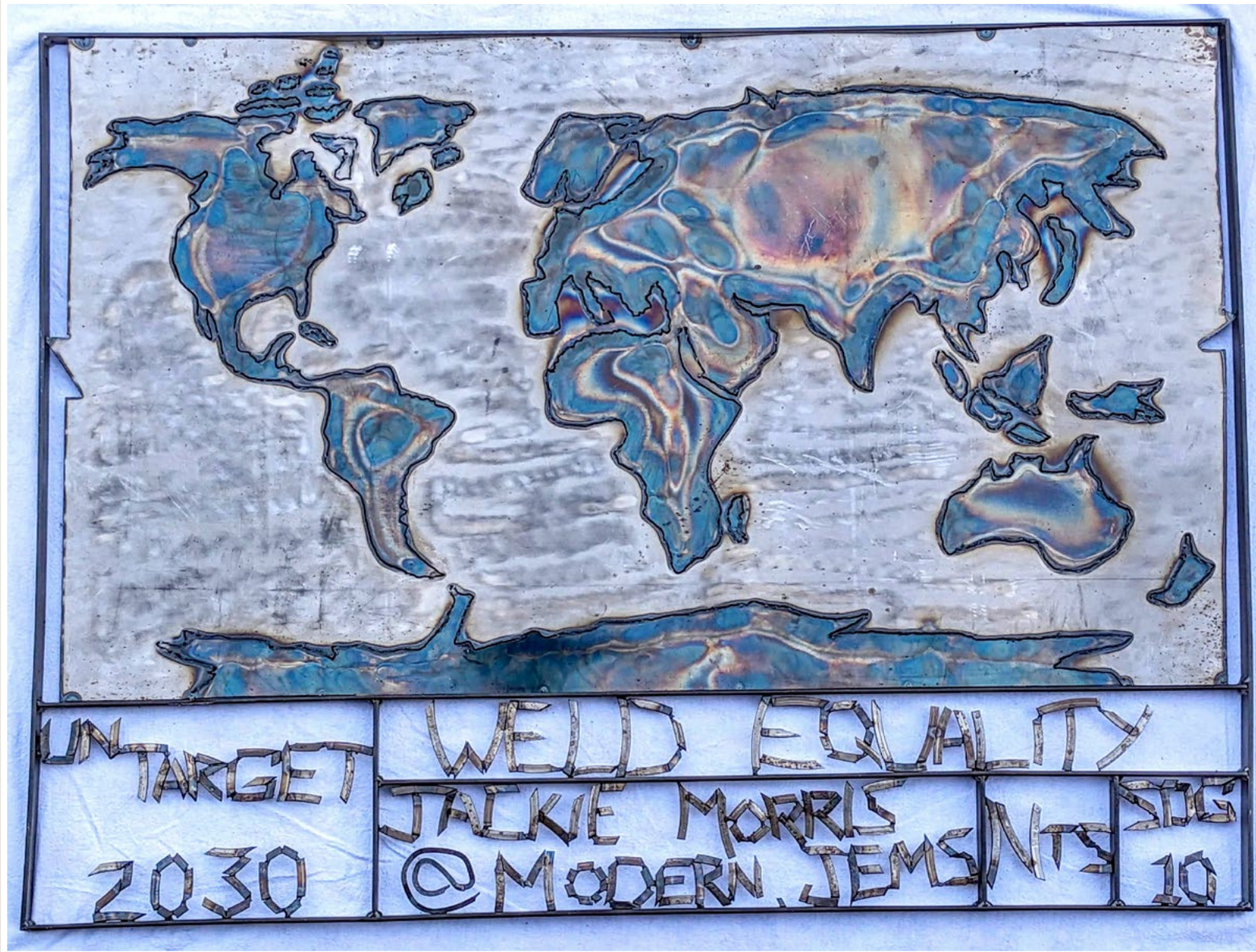
Gas Metal Arc Welding (GMAW), Plasma Arc Cutting, Oxy-Fuel Heating, ironworker, bandsaw, grinder and hand tools.

### Dimensions of exhibit

81.5 cm height x 110 cm wide x 2.5 cm deep







*Weld Equality*  
Jackie Morris





# Jennifer Phillips (Canada)

Jennifer's welding career started in a pipe fabrication shop at 16 years old. She fell in love with welding early on and completed welding school and received her Canadian Red Seal certification shortly after high school. She continued to work in oilfield construction for several years until she had her daughter. This is when she discovered that there was more opportunity as a welder outside of construction, specifically the art world. She began creating small birds out of cutlery and now, 3 years later she is creating realistic life-sized steel sculptures.

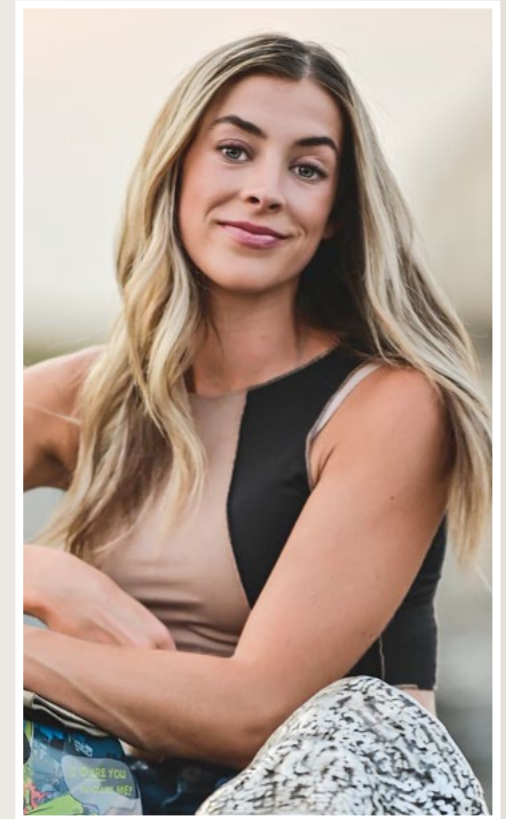
Inspiration for her art largely comes from wildlife and the outdoors including conservation success stories. In 2018, the African Wildlife Foundation helped secure more safe space for the mountain gorilla by purchasing 27.8 hectares adjacent to Volcanoes National Park in Rwanda. The first expansion to the protected area in over three decades, the donation helps Rwanda invest in its rich biodiversity and develop economic opportunities through tourism. This intervention has saved endangered gorilla species and lowered poaching numbers and as tourism revenue rises, the peoples' way of thinking behind poaching and conservation changes positively.

<https://www.awf.org/blog/mountain-gorilla-tourism-drives-economic-growth-and-conservation>

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# SDG 8 Promote sustained, inclusive and sustainable economic growth, employment and decent work for all

8 DECENT WORK AND ECONOMIC GROWTH



This SDG involves promoting beneficial and sustainable tourism. This has been defined as tourism which is developed and maintained in an area in such a manner and at such a scale that it remains viable over an infinite period while safeguarding the Earth's life-support system on which the welfare of current and future generations depend.

## Exhibit "Kong"

Gas Metal Arc Welding (GMAW) of both mild steel and stainless steel was used. The metal sculpture "Kong," was started by bending steel rods to form a frame that resembled the profile of a Gorilla. Spoons were cut and welded in to create eye sockets and ears were formed welded and ground into shape.

Layers of welds fill in the space between the rods and then the overall piece is sanded down to an even level. To create realism in the face, beads of welds were carefully placed, layered, and ground down to form lines such as the brow on the gorilla's face. By spacing welds apart then sanding down the metal brings contrast of light and dark within the steel and creates texture in the sculpture bringing the steel to life.

## Dimensions of exhibit

32 cm high x 28 cm wide x 38 cm deep





**Kong**  
Jennifer Phillips







# Bulgarian Welding Society's 2023 Welded Art Competitions

The Bulgarian Welding Society (BWS) has also incorporated the organisation of welding skills and welded art competitions into its strategies to improve the image of welding and increase the attractiveness of welding careers at all qualification levels.

On 25 March, 2023, it held a national competition "Best Young Welder of Bulgaria 2023" which also included a presentation of a welded art collection on a previously announced theme. The competition was attended by students from 10 professional high schools from Burgas, Beloslav, Knezha, Gorna Oryahovitsa, Sliven, Dupnitsa, Elhovo, Kazanlak and Yambol. The students were from the professional field "Mechanical engineering, metalworking and metallurgy" and the field "Motor vehicles, ships and aircraft".

The competition was held for the fourth consecutive year under the auspices of the Bulgarian Ministry of Education and Science and the Bulgarian Welding Society both ably assisted by Neksas Ltd on whose premises the competitions were held in Sofia and Kammarton Bulgaria which supported the initiative with prizes and gifts.

The students also presented to the jury and their peers their works on the topic "Sustainable Development Goals – Through the Eyes of Young Bulgarian Welders".

The compositions were evaluated on criteria such as: compatibility with the declared theme and UN Sustainable Development Goals, as well as their forward thinking and ideas.

Three of the exhibits are featured in the IIW 2023 Digital Collection:

**SDG 2:** Unity with Nature – Conservation of Fauna and Flora. Artists: Ivan Iliyanov Georgiev and Marijan Magdalenov Panayotov

**SDG 7:** Affordable and Clean Energy. Artists: Hakan Emin Emin and Martin Veselinov Mihnev

**SDG 8:** Computer, Tractor, Skier. Artists: Diyan Bojidarov Alioshev and Stefan Stoyanov Stoyanov

By linking with the BWS website, you can view the exhibits for the 2023 competitions. > News > NATIONAL COMPETITION "Best Young Welder from Vocational High Schools" 25.03.2023



# Diyan Bojidarov Alioshev & Stefan Stoyanov Stoyanov (Bulgaria)

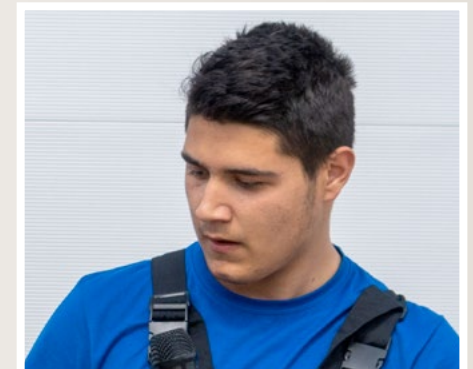
Diyan and Stefan attend the Professional High School for Mechanical Technology in the town of Sliven. They competed as a team in the “Sustainable Development Goals – Through the Eyes of Young Bulgarian Welders” competition hosted by the Bulgarian Welding Society (BWS) in conjunction with the Bulgarian Ministry of Education and Sciences from 24-25 March, 2023 in Sofia, Bulgaria.

The school allows students to work in different fields including sports, technical, scientific and artistic while at the same time finding a good work-life balance. Diyan and Stefan wished to depict the promotion of the objectives of sustained economic growth, higher levels of productivity and technological innovation in their exhibit.

To do this, they chose three figures representing three different industry sectors, agriculture, science and technology, and sports, all of which could meet this objective.



*Diyan Bojidarov Alioshev*



*Stefan Stoyanov Stoyanov*

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# SDG 8 Promote sustained, inclusive and sustainable economic growth, employment and decent work for all

8 DECENT WORK AND ECONOMIC GROWTH



This SDG has a range of targets, sustainable economic growth, diversify, innovate and upgrade for economic productivity, promote policies to support job creation and growing enterprises, improve resource efficiency in consumption and production, full employment and decent work with equal pay, promote youth employment, education and training, end modern slavery, trafficking, and child labour, protect labour rights and promote safe working environments, promote beneficial and sustainable tourism, universal access to banking, insurance and financial services.

## Exhibit "Computer, Tractor, Skier"

The students are emphasising the importance of earth works so a tractor is depicted. Diyan collected all of his parts from visiting motorbike and engine reconditioning stores and getting old valves, sprockets, bearings, etc from the local scrap yards. From there, parts are cleaned, degreased, buffed and polished ready to be placed and welded.

Stefan then used a combination of Gas Metal Arc Welding (GMAW), a sheet guillotine to cut the pieces of the machine and valves, nuts, ball bearings for depicting the tractor.

The science worker in front of the computer was formed from old car parts welded together – bolts, nuts, some wire and planks. The computer is an old desktop one with a keyboard and a monitor.

With regard to their love of sports, both students chose to show a skier. A plasma cutter was used to cut and shape the skis and some studs and nuts to get the composition.

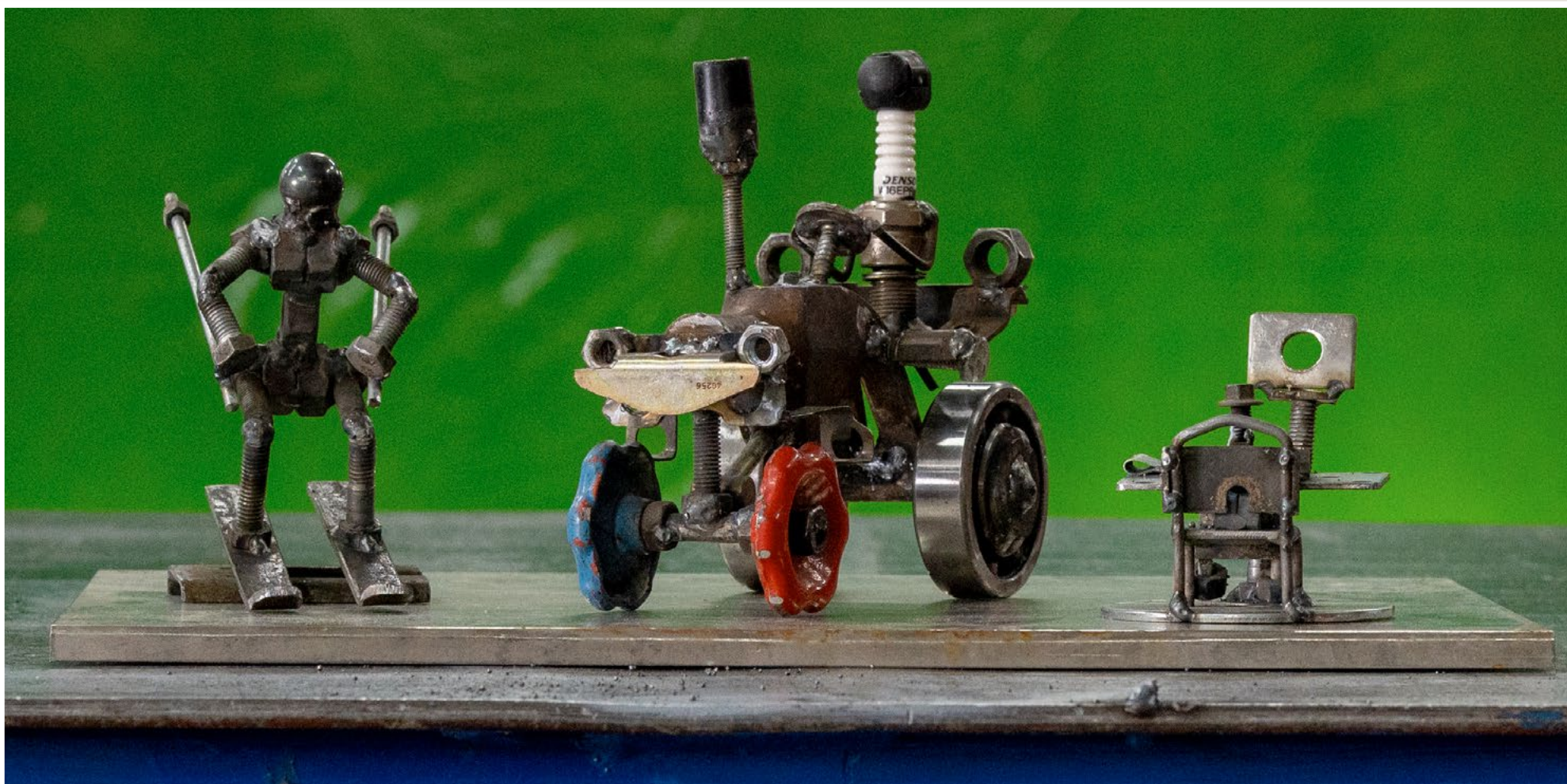
The exhibit has been made with love and careful craftsmanship.

## Dimensions of exhibit

40 cm high x 50 cm square







*Computer, Tractor, Skier*  
Diyan Bojidarov Alioshev & Stefan Stoyanov Stoyanov



# Hakan Emin Emin & Martin Veselinov Mihnev (Bulgaria)

Haken and Martin attend the Professional High School for Mechanical, Electrical and Electronic Technology in the town of Burgas. They competed as a team in the “Sustainable Development Goals – Through the Eyes of Young Bulgarian Welders” competition hosted by the Bulgarian Welding Society (BWS) in conjunction with the Bulgarian Ministry of Education and Sciences from 24-25 March, 2023 in Sofia, Bulgaria.

They selected a topic that is very close to their hearts – clean industry and the use of sustainable energy sources.

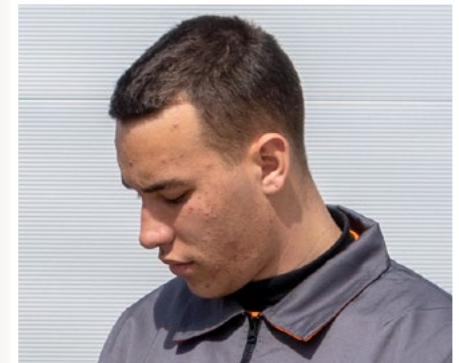
They are both in their final years of Mechatronics. Martin is dreaming of becoming an engineer and Hakan wants to teach children, transferring to them the skill he has, which led him to the third place of the Best Bulgarian Young Welder 2023 competition.

The artists live in the Burgas region, an industrial area with very large production plants of all kinds situated there including the largest refinery in the Balkans as well as a very big port. A region therefore requiring reliable, affordable and clean energy.

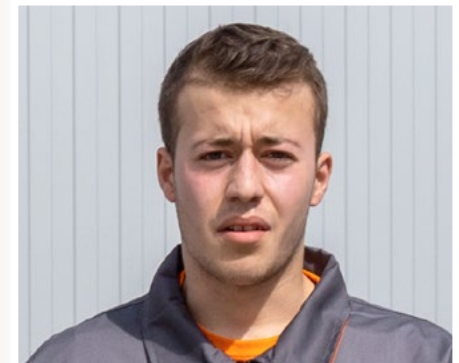
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*Hakan Emin Emin*



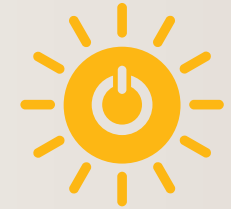
*Martin Veselinov Mihnev*





# SDG 7 Ensure access to affordable, reliable, sustainable and modern energy for all

7 AFFORDABLE AND CLEAN ENERGY



This Goal aims to improve the percentage of a population with access to electricity as well as the renewable energy share and energy efficiency.

This includes universal access to modern, affordable and reliable energy, increasing global percentage of renewable energy, doubling the improvement in energy efficiency as well as promoting access to research, technology and investments in clean energy infrastructure, and expanding and upgrading energy services for developing countries.

## Exhibit "Affordable and Clean Energy"

The exhibit has most of the well-known energy sources – solar power, wind and water power. Ensuring access to all of such nature preserving ways is depicted by the two pillars of technology which

are formed from scrap materials from old lathes. Trees are shown symbolising the close interaction and willingness to keep the environment clean.

Energy is vital and the exhibit shows houses of carbon steel with solar panels depicted with weld engravings. The water generator is made from a discarded rotor and the windmill is made with rotating blades. For the bridge, carbon steel and springs are used.

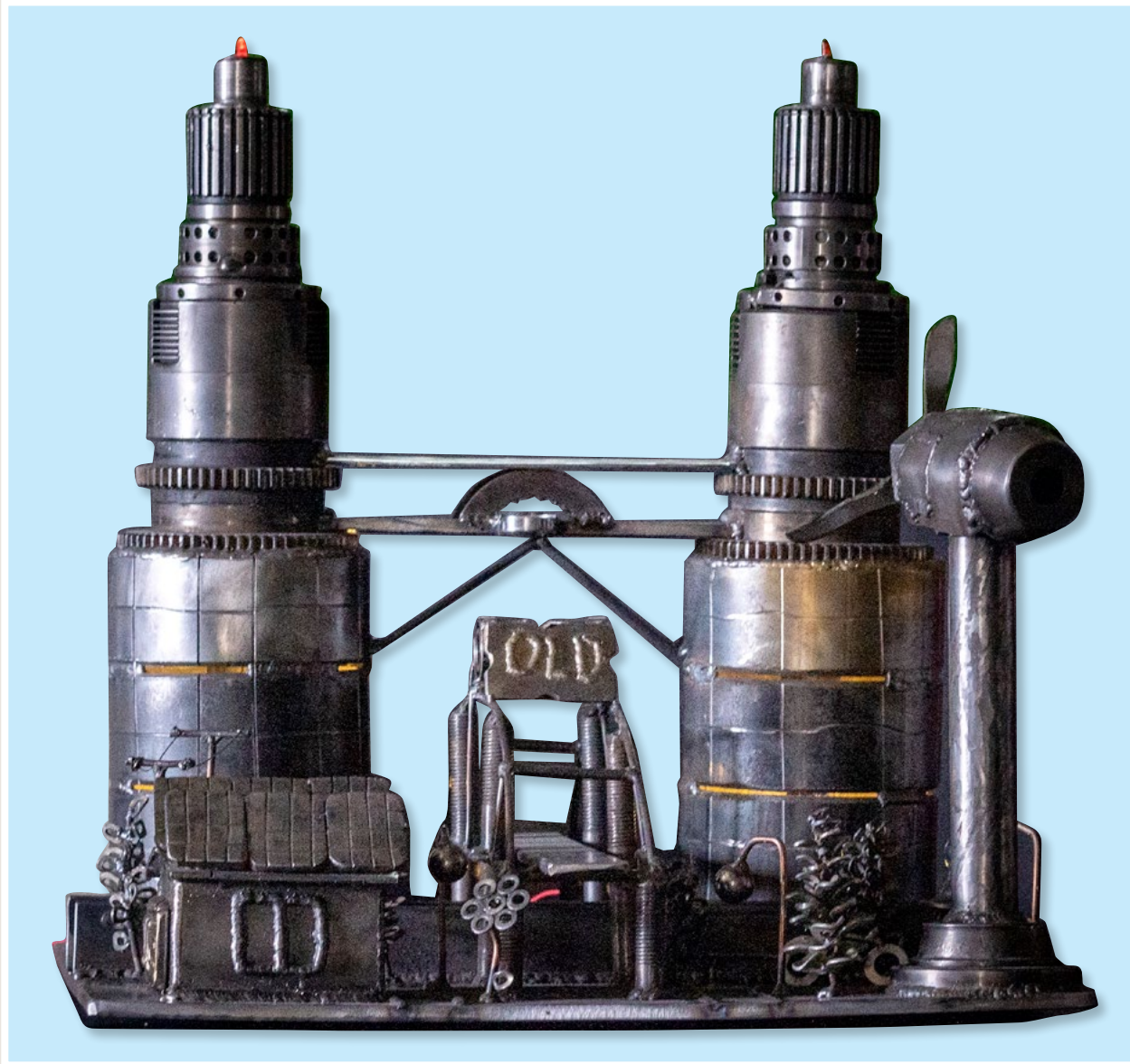
The exhibit symbolises the transition from carbon based fuels into new and eco-friendly energy sources. The logo of the school is 3D printed.

## Dimensions of exhibit

50 cm high x 50 cm square







*Affordable and Clean Energy*  
Hakan Emin Emin & Martin Veselinov Mihnev



# Ivan Iliyanov Georgiev & Marijan Magdalenov Panayotov (Bulgaria)

Ivan and Marijan attend the Professional High School “Stephan Karadja” Elhovo in the town of Elhovo.

They competed as a team in the “Sustainable Development Goals – Through the Eyes of Young Bulgarian Welders” competition hosted by the Bulgarian Welding Society (BWS) in conjunction with the Bulgarian Ministry of Education and Sciences from 24-25 March, 2023 in Sofia, Bulgaria.

They decided on one of the most important goals: to achieve food security, end hunger and promote sustainable agriculture while at the same time protecting flora and fauna. This is connected to the agriculture balance required with the forests and the human hands are a symbol of a means of both protection and preservation. In order to feed all the growing population it is vital not to allow environmental degradation and biodiversity loss. It is now a significant problem in many countries, both developed and developing, where the changes being made related to food production are now taking a heavy toll on the natural world around us.

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*Ivan Iliyanov Georgiev*



*Marijan Magdalenov Panayotov*



# SDG 2 End hunger, achieve food security and improved nutrition, and promote sustainable agriculture

2 ZERO HUNGER



A key 2030 target with this SDG is to ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters, and that progressively improve land and soil quality.

## Exhibit "Unity with Nature – Conservation of Fauna and Flora"

For this piece, the students wanted to showcase their love of nature as well as their newfound skills in metal arc welding.

The tree in the exhibit was made with a combination of two techniques, Shielded Metal Arc Welding (SMAW) and Gas Metal Arc Welding (GMAW). The entire piece is fabricated from steel, most of it scraps from other projects. The idea was to also show that metal doesn't have to always appear cold and hard, but can have a certain organic quality to it, as with the base plate giving a black soil appearance.

The tree is the symbol of life.

## Dimensions of exhibit

80 cm high x 50 cm square







*Unity with Nature –  
Conservation of Fauna  
and Flora*

*Ivan Iliyanov Georgiev &  
Marijan Magdalenov Panayotov*



# The Indian Institute of Welding (IIW-India)

## Welded Art Competitions

On a similar basis as other IIW Members, as part of the global community, IIW-India also embraces collective international action, cooperating and collaborating where applicable, to apply global solutions to global challenges. For example, IIW-India is working in line with the Indian Government's national initiatives to help India to achieve the United Nations Sustainable Development Goals (SDGs) by 2030.

A downloadable report "IIW-India and India's National Welding Capability and their Significance to the UN Sustainable Development Goals (SDGs)" is available on:

<http://iiwindia.com/wp-content/uploads/2022/02/IIW-India-NWC-Report-on-UN-SDG.pdf>

### IIW-India's Welded Art Exhibitions

As a part of its drive to improve India's National Welding Capability (NWC), IIW-India has introduced strategies to help alleviate the skills shortages in the welding field in line with Indian Government initiatives.

In 2020, it held a welded art exhibition as part of the 5th IIW International Congress and Weld India Exhibition 2020 in Navi Mumbai from 6-9 February, 2020 and a welded art national competition on "Welded Marvels 2021-22 – Project Trash to Treasure" in February, 2022, and displayed the exhibits during its National Welding Seminar 5-7 May, 2022 in Pune. In December, 2022, it conducted the "Welded Marvels 2022 – Project Trash to Treasure" competition with 24 entries received.

The competition was organised in conjunction with the Association of Welding Products Manufacturers (AWPM) and ably supported by M/s Ador Welding Ltd, Mumbai.

Two of the exhibits, **Mahatma Gandhi (SDG 1)** and **GREENOX – World of Green Energy (SDG 13)**, are featured in this Collection.



# Bichitra Kumar Padhiary Team Leader, ITI, Berhampur (India)

He entered the IIW-India National Competition for “Welded Marvels 2022 – Project Trash to Treasure” and with his exhibit “Mahatma Gandhi” he was awarded first prize. He has also received felicitations from Dr Rajat Kumar Panigrahy, Principal, Govt. ITI, Berhampur and appreciation from Smt. Usha Padhee, Principal Secretary, Skill Development and Technical Education Department, Govt. of Odisha and appreciated by Ministry of Skill Development Govt. of India  
<https://twitter.com/MSDESkillIndia/status/1615246410835984387?s=20>

Mohandas Karamchand Gandhi is widely recognized as one of the twentieth century’s greatest leaders and led many campaigns against inequality and poverty. Due to his stature, he is now referred to as Mahatma, meaning “great soul.” He was also famous for his quotes related to poverty including “There’s enough on this planet for everyone’s needs but not for everyone’s greed”, “Poverty is the worst form of violence”, ‘To a man with an empty stomach food is God”.

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# SDG 1

## End poverty in all its forms everywhere

1 NO  
POVERTY



Achieving SDG 1 would end extreme poverty globally by 2030. One of its indicators is the proportion of population living below the poverty line. The data gets analysed by sex, age, employment status, and geographical location (urban/rural).

It is hoped that the mobilisation of resources and the establishment of poverty eradication policy frameworks at all levels can be implemented to help achieve the end of poverty. The eradication of extreme poverty, reduction of all poverty by half, implementation of social protection systems, ensuring equal rights to ownership, basic services, technology and economic resources, and the building of resilience to environmental, economic and social disasters are key to this.

### Exhibit "Mahatma Gandhi"

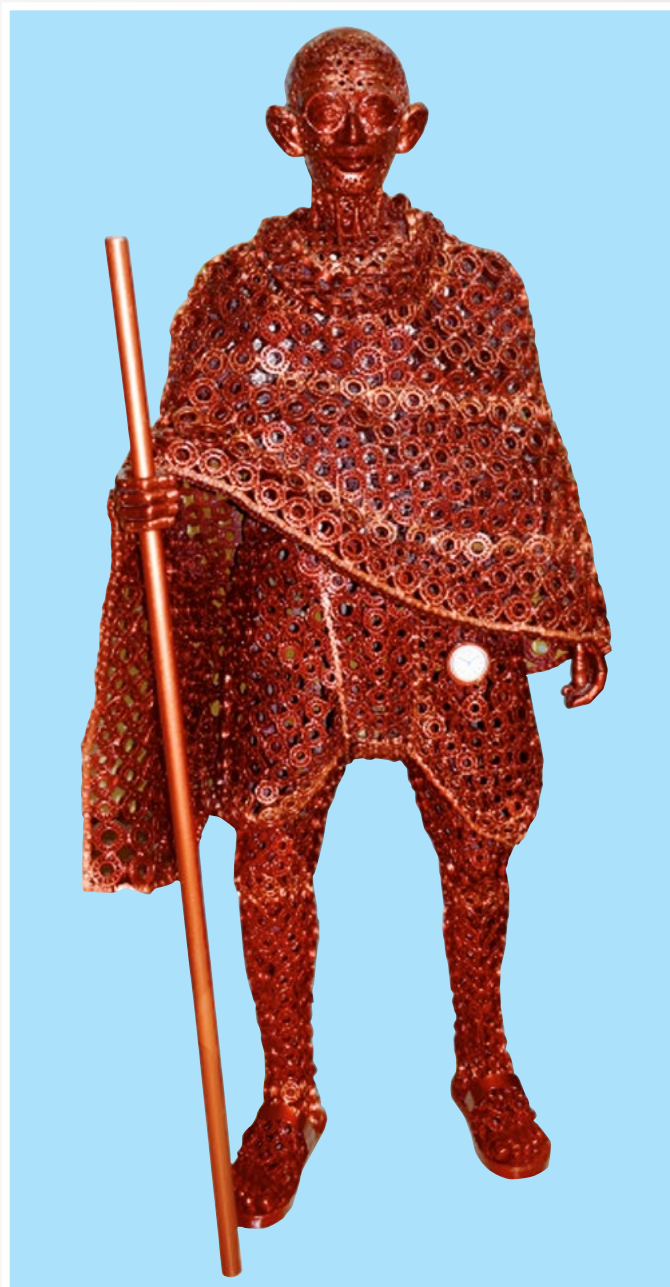
The exhibit was fabricated from scrap metal items which were cleaned by petrol and wire brushing. It was welded using Shielded Metal Arc Welding (SMAW) and after further cleaning was beautifully painted. It was shaped mostly with the aid of tools such as an angle grinder, a bench vice and a ball peen hammer

A key objective of the competition was to use scrap parts and the range of parts used included fan ball bearings, a bike crank, timing chain, sheet metal, round rod and square pipe amongst other items.

### Dimensions of exhibit

Full size with a height of 1.65 m





*Mahatma Gandhi*  
Bichitra Kumar Padhiary



# Digvijay Prajapati, Ravi Bhaliya & Dharmesh Thakrada (India)

The team of three artists are employed at INOXCVA which has the key words for survival as CLEAN ENERGY, whereby humanity at all times, through generations, is in pursuit and continued quest for developing the most economical sources of Green Energy. Having achieved Excellence in Design, Modelling, Analysis, Sourcing, Procurement and Manufacturing, INOXCVA is working continuously towards Clean Energy initiatives in LNG, Liquid Hydrogen & Fusion Energy.

The team entered the IIW-India National Competition for **“Welded Marvels 2022 – Project Trash to Treasure”** with the exhibit **“GREENOX – World of Green Energy”**.

The exhibit focused towards renewable energy sources catering for green energy with the manufacture of all appropriate equipment also empowering women welders in industry.

The INOXCVA team members felt that with the increased number of green energy sources becoming available, they could build up an inspiring green energy exhibit which would also illustrate the increasing benefits of the renewable energy sources in combating climate change.

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*Digvijay Prajapati*



*Ravi Bhaliya*



*Dharmesh Thakrada*





# SDG 13 Take urgent action to combat climate change and its impacts by regulating emissions and promoting developments in renewable energy

13 CLIMATE ACTION



This SDG covers a wide range of issues surrounding climate action. Strengthen resilience and adaptive capacity to climate-related disasters, integrate climate change measures into policies and planning, build knowledge and capacity to meet climate change and promote mechanisms to raise capacity for planning and management.

## Exhibit "GREENOX – World of Green Energy"

The team focused on including a wind turbine, LNG vessel, Liquid H2 vessel, LNG bus, solar station with storage battery, house with solar roof and a tree.

A key objective of the competition was to use scrap parts and the range of parts used included stainless steel plate, pipe and box, bearing, nuts and washers, carbon steel TIG filler wire ER-70S2 2.0 mm diameter and stainless steel TIG filler wire ER-309L 1.6 mm diameter, stickers, welding black glass and stainless steel wire, 0.3 mm dia.

## Dimensions of exhibit

70 cm high x 70 cm wide x 60 cm deep





**GREENOX –  
World of Green Energy**

*Digvijay Prajapati,  
Dharmesh Thakrada  
and Ravi Bhaliya*



# An example of improving the SDGs through welded art

Infine Art Ventures works very closely with supporting The Indian Institute of Welding (IIW-India) with its welded art competitions and has contributed the “Gorilla”, “The Hockey Player” and “Bicycle” to this IIW 2023 Digital Collection.

ArtCroc is a registered brand of Infine Art Ventures LLP, a DPIIT (Govt of India) recognised Art Start-up known for its unique idea of creating beautiful sculptures from scrap metal.

Converting scrap into valuable art pieces is an innovative way to show concern for the environment encouraging the masses to reuse, reduce and recycle for a better future. ArtCroc has launched initiatives where companies and government entities provide their scrap to be converted into stunning and meaningful artworks.

ArtCroc’s talented team of professional artists and trained welders have adorned public places like railway stations, airports, traffic islands etc with large sculptures welded using metal scrap like mild steel, stainless steel, automobile scrap etc. Besides creating better

meaningful public places, it has also provided more earning opportunities for welders. Normal welders earn INR 400 to 700 per day while a welder creating artwork earns INR 1000 to 1200 per day.

Examples of recent initiatives include creating twelve sculptures from scrap metal for a city called Gwalior in the Indian State of Madhya Pradesh keeping heritage, cultural and socio- economic values that the city has to offer.

They also invited twenty artists from different parts of the world to a small town called Jajpur in the Indian State of Odisha where five Nigerian artists created five large sculptures made using scrap metal and they are presently creating a sculpture, made from brass and stainless steel, weighing 5000 kilograms, which will be installed at an altitude of 3500 meters at Kedarnath, one of the holiest places of India.





## Jitendra Solanki (India)

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The exhibit is a symbol of the importance of the bicycle. In many rural areas in India, young girls often struggle to attend school since there are no school buses available to take them the long distances to the nearest schools. In West Bengal, a programme to give bicycles to 4 million young girls in rural areas was introduced with great results in 2015. This is a great initiative with lots of benefits which the welding industry could contribute significantly to. <https://wbsaboojsathi.gov.in/v2/>

With respect to the bicycles, if this concept spread to all other states in India, the number of welded frames required would be immense. Maybe India could set up a bicycle industry to rival Taiwan as the “Bicycle Kingdom”.

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Curator: Sachin Kaluskar, Designated Partner, Infine Art Ventures LLP



## SDG 5

# Achieve gender equality and empower all women and girls

5 GENDER  
EQUALITY



The achievement of this SDG would grant women and girls equal rights, opportunities to live free from discrimination including workplace discrimination or any violence. Education is a key to fostering equal rights to economic resources, property ownership and financial services for women, promoting empowerment of women through technology, adopting and strengthening policies and enforcing legislation for gender equality, hence the importance of enabling young girls to access as many educational opportunities as possible.

### Exhibit "Bicycle"

The exhibit was fabricated for Gwalior City in India, from scrap metal items which were cleaned and coated with red oxide metal primer. It was welded using electric welding machine and after further cleaning, painted with DUCO paints.

A key objective of the sculpture was to use scrap parts and the range of parts used included mild steel rods, plates, pipes, C channels, angle bars, amongst other items.

### Dimensions of exhibit

3.0 m high x 2.5 m wide x 0.6 m deep





*Bicycle*  
Jitendra Solanki





## Jitendra Solanki (India)

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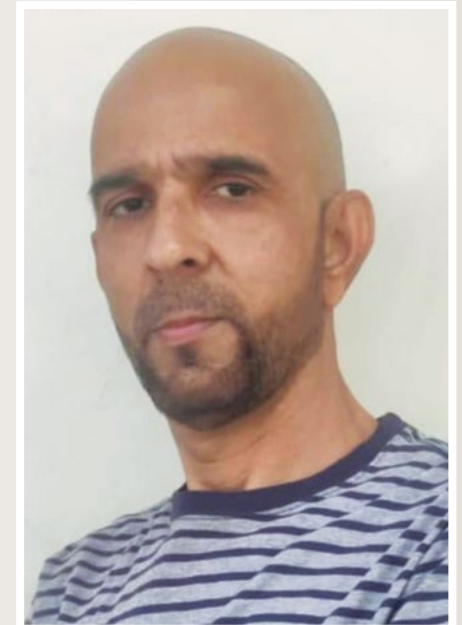
ArtCroc's talented team of professional artists and trained welders have adorned public places like railway stations, airports, traffic islands etc with large sculptures welded using metal scrap like mild steel, stainless steel, automobile scrap etc.

The world is going through lots of challenges and turbulent times affecting mental health of millions of people. In such a scenario, mental health care remains a top priority. We must act in finding ways to positively promote this care.

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## SDG 3

# Ensure healthy lives and promote well-being for all at all ages

## 3 GOOD HEALTH AND WELL-BEING



There are many factors negatively affecting the well-being of people globally. This SDG sets out to improve all the different aspects impacting peoples' well-being. One aspect is mental health which is associated with a number of factors such as diet, exercise, stress, drug abuse, social connections and interactions, poverty, security amongst others. All of these are intimately associated with most of the SDGs. Depression and anxiety are probably the most common mental disorders.

### Exhibit "Hockey Player"

Hockey is the national game of India. With this sculpture, healthy living through sports is promoted. Hockey is the game that improves brain function and alleviates anxiety. The game provides

body exercise, helps maintain physical fitness & also improves mood. It helps to release endorphins, which in turn, help to combat depression, stress and anxiety. In addition to the overall exercise benefits hockey offers, the need to make quick decisions also assists in developing the brain.

For Gwalior City in India, a sculpture of a Hockey Player was created from metal waste. Mild Steel plates and Thermo Mechanically Treated (TMT) bars have been welded together to create this 3.7 metres tall player. This sculpture was created with an electric welding machine.

### Dimensions of exhibit

3.7 m high x 2.0 m wide x 1.0 m deep





*Hockey*  
Jitendra Solanki





## Ajayi Toyeeb (Nigeria)

This sculpture has been created by Ajayi Toyeeb, a renowned artist from Nigeria, at the International Art Symposium (Jajpur, Odisha) in 2022.

ArtCroc curated the International Art Symposium at Odisha State of India with 20 artists being invited from across the world and creating beautiful artworks from scrap & other materials.

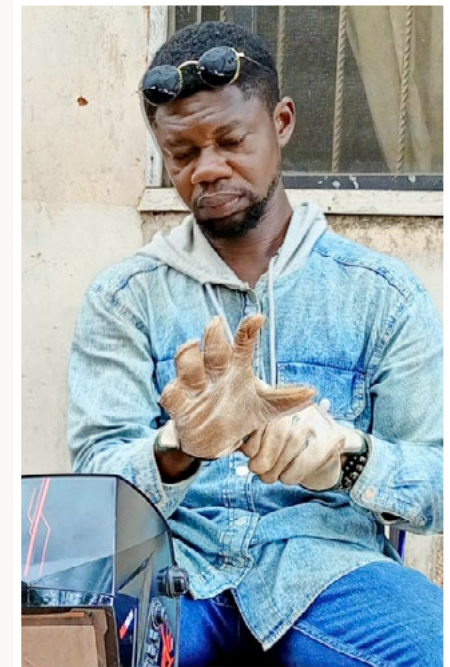
ArtCroc is a registered brand of Infine Art Ventures LLP, a DPIIT (Govt of India) recognised Art Start-up known for its unique idea of creating beautiful sculptures from scrap metal. Converting scrap into valuable art pieces is an innovative way to show concern for the environment encouraging the masses to reuse, reduce and recycle for a better future.

This unique exhibit addresses the environmental sustainability issues along with the wildlife preservation concerns for endangered species across the globe.

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Curator: Sachin Kaluskar, Designated Partner, Infine Art Ventures LLP



# SDG 15 Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

15 LIFE ON LAND



This SDG aims to help increase financial resources to conserve and sustainably use ecosystem and biodiversity, finance and incentivise sustainable forest management, and combat global poaching and trafficking. The proportion of remaining forest area, desertification and species extinction risk are example indicators of this goal.

## Exhibit "Gorilla"

Recycle, Rebuild, Revive was the mantra that inspired this fine sculpture of a gigantic gorilla made from waste tyres and metal scrap. The exhibit could also be linked to SDG 12, Ensure sustainable consumption and production patterns.

Besides discarded tyres, materials used included Thermo Mechanically Treated (TMT) bars, mild steel plates and C channels. The Gorilla sculpture was created using electric arc and plasma arc welding machines.

Making such green use of tyre waste with an infused mission of sensitising and raising awareness about endangered animals that are at the risk of extinction due to various factors such as habitat loss, poaching, and climate change is a critical step towards a more sustainable future.

Leading tyre manufacturers and leading environmental organizations across the world could be encouraged to collaborate under the "Trash to Treasure" mission to explore the potential of such unique artistic possibilities as well as boosting environmental and ecological sustainability including protecting endangered animals and their habitat.

## Dimensions of exhibit

4.57 m high x 2.5 m wide x 2 m deep







Gorilla  
Ajayi Toyeeb





# Romanian Welding Society (ASR)

## Welded Art Exhibitions

The Romanian Welding Society (ASR) is a not-for-profit organisation with more than 800 members, comprising individual and corporate, universities and industrial companies, grouped in 18 branches across Romania and Republic of Moldova. Together with the National Research-Development Institute for Welding and Material Testing (ISIM) Timișoara, ASR is a Member of the 51 Member Country International Institute of Welding (IIW).

ASR and the welding industry are also working in line with the Romanian Government's national initiatives, to help Romania to achieve the United Nations Sustainable Development Goals (SDGs) by 2030. A downloadable report "ASR and Romania's National Welding Capability (NWC) and their significance to the UN Sustainable Development Goals (SDGs)" is available on [www.asr.ro](http://www.asr.ro)

### ASR's Welded Art Exhibitions 2021-2023

ASR has also incorporated the organisation of welded art exhibitions into its Strategic Objective A "To improve the image of welding and increase the attractiveness of welding careers at all qualification levels.

Such exhibitions are being held in conjunction with ASR's national conferences each year. For example, one was held in conjunction

with the Babes-Bolyai University, Faculty of Engineering, Resita, Romania on 22-23 April, 2021 during the ASR International Conference "Welding 2021".

In 2022, it was held as part of the ASR conference "Welding 2022" held in Cluj- Napoca and participants were very satisfied with the outcomes of the Conference and the high quality of the welded art exhibition.

This year it was held in conjunction with the ASR Conference "Sudura 2023" held at the "Dunărea de Jos' University of Galati, Romania on 27-28 April, 2023.

The IIW 2023 Digital Collection features two exhibits from ASR's exhibitions:

**SDG 16** Exhibit: Galatiensis. Artist: Ivan Baraghin (Romania) and

**SDG 16** Exhibit: The Engineer's Heart. Artist: Paul Mironov (Romania).

You can watch the 2022 exhibition on YouTube – Welded Art Exhibition (Professional artists)": (<https://youtu.be/8ML6rd3Jj8k>), and Welded Art Exhibition (Hobby artists):

<https://youtu.be/gddY-V6XFTg>

Available at the ASR link <https://asr.ro/asr-welded-art-exhibitions/> you can view and download the booklets containing the exhibits for the 2021, 2022 and 2023 exhibitions.



## Ivan Baraghin (Romania)

Ivan Baraghin was born in Chisinau, Republic of Moldova and attended the Faculty of Engineering, “Dunărea de Jos” University of Galati. Between 2017 and 2019, he attended the Master’s degree in Welding Engineering Design and Simulation at the Faculty of Engineering, “Dunărea de Jos” University of Galati.

Linking a country’s National Welding Capability (NWC) and the Sustainable Development Goals could involve strategies being 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 are related to the single global focus.

A Flagship is the most important ship in the fleet of ships, especially the one on which the commander of the fleet is sailing.

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# SDG 16 Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

16 PEACE, JUSTICE AND STRONG INSTITUTIONS



This SDG promotes the rule of law and ensures equal access to justice, substantially reduces corruption and bribery, develops effective, accountable and transparent institutions, ensures responsive, inclusive and representative decision-making, strengthens the participation in global governance, provides universal legal identity, ensures public access to information and protects fundamental freedoms.

## Exhibit "Galatiensis"

The exhibit was made in 2017, in order to support the diploma project entitled "Design and production of a naval model".

The ship GALATIENSIS was made of steel plate, modelled and welded by hand with coated electrodes.

Electrode wire was used to represent the connections between masts, sails and rigging on board a sailing ship and nuts were used to represent the sail and porthole fastening systems.

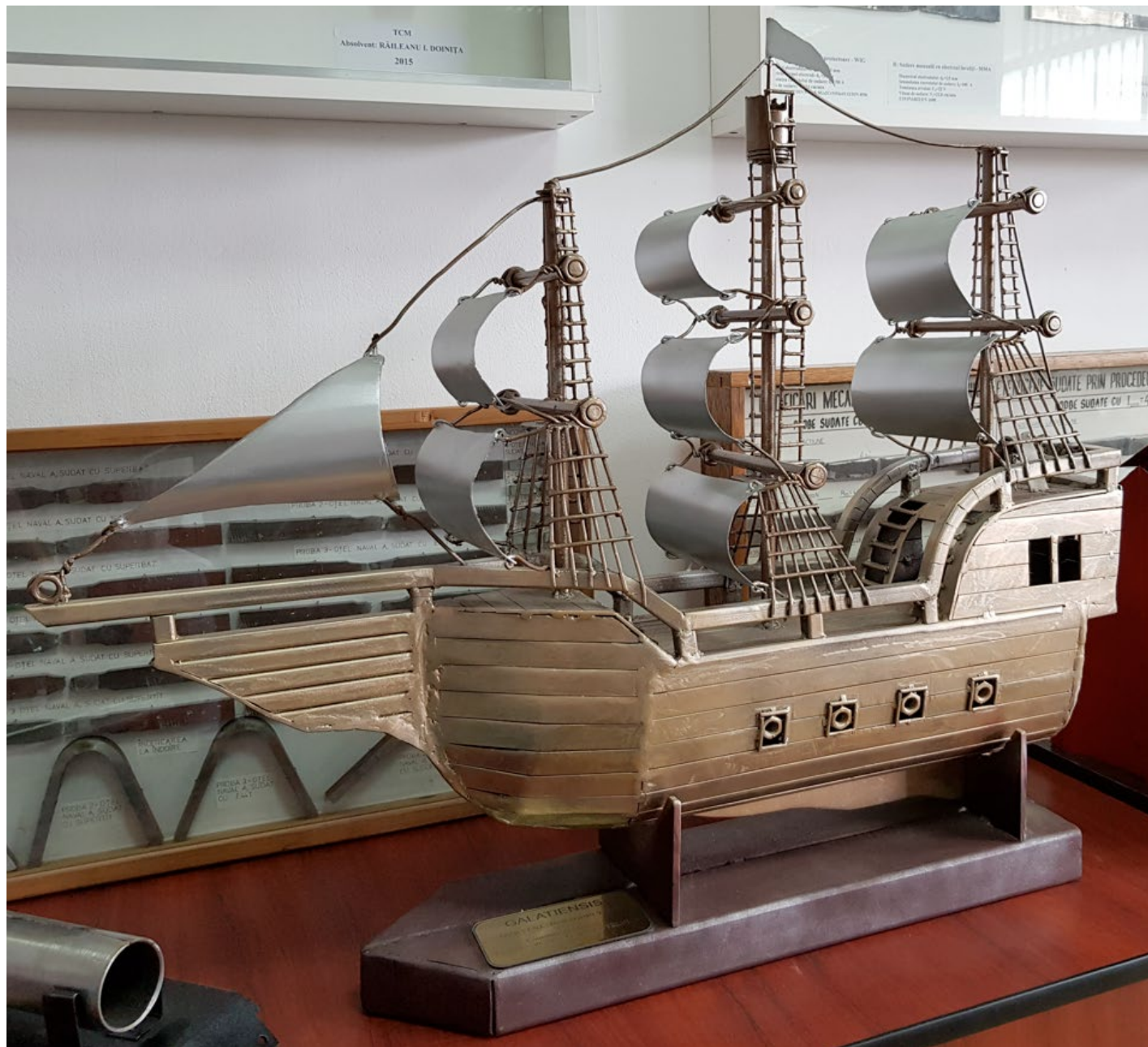
The exhibit was featured in the Romanian Welding Society (ASR) welded art photographic exhibition launched at the Resita Center of the Babes-Bolyai University on 22 April, 2021.

## Dimensions of exhibit

77 cm high x 87 cm wide x 20 cm deep







*Galatiensis*  
Ivan Baraghin



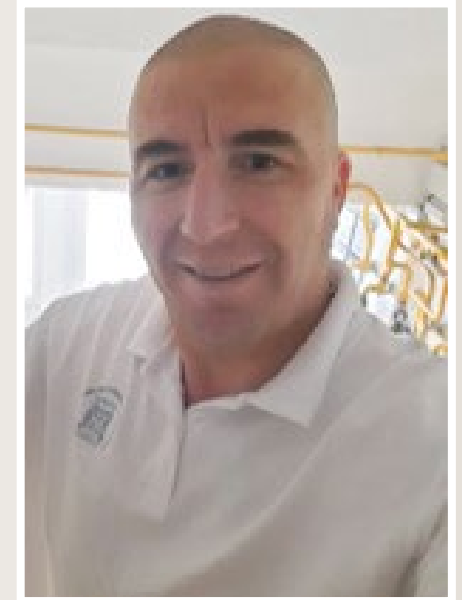
## Paul Mironov (Romania)

Paul Mironov is a welding technician in the Department of Manufacturing Engineering, Faculty of Engineering, "Dunărea de Jos" University of Galati.

His passion for transforming and shaping "metal" has led to the development of more than 30 exhibits, combining manufacturing processes such as welding, cutting, polishing.

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In the welding related institutions, codes of ethics enable personnel to be accountable for their actions. Welding related professionals have a duty to uphold the highest standards of professional conduct including openness, fairness, honesty, integrity, respect for life, law, the environment and public good, accuracy and rigour, leadership and communication.

Fidelity to public needs, including safety, health and welfare, is also shown in the welding institutions where at every personnel level, qualifications and certifications plus codes of ethics have been introduced to ensure devotion to high ideals of personal honour and professional integrity, knowledge of developments in the area of professional relevance to any services that are undertaken and competence in the performance of any professional services that are undertaken.

## Exhibit "The Engineer's Heart"

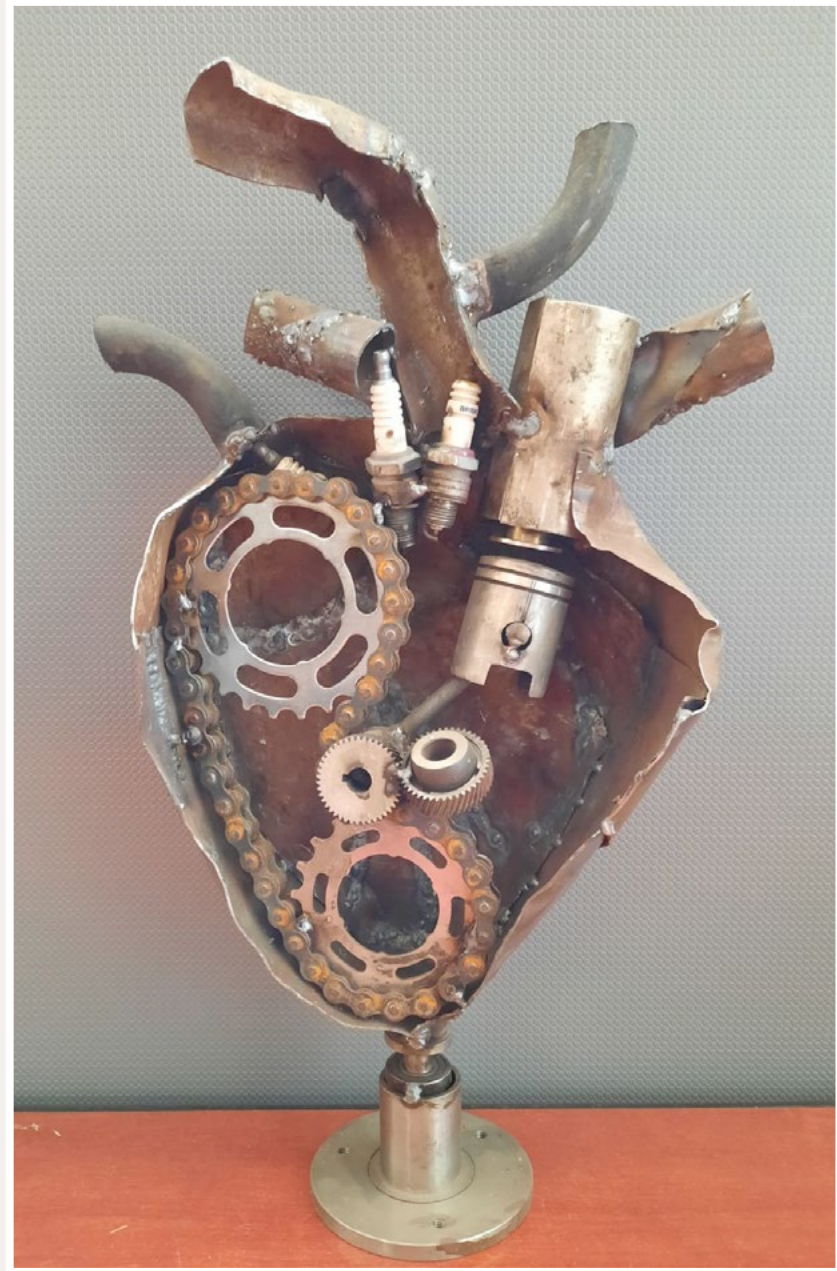
The Engineer's Heart was made in 2021 in the Department of Manufacturing Engineering at the University of Galati using recyclable objects, which the artist transformed into a metal art exhibit. His vision started from the fact that the heart is the engine of life and of the whole body, and the engineer's heart is the engine of movement. The engine of movement drives creation, innovation and ethical characteristics that underpin modern developments in engineering. The exhibit was featured in the Romanian Welding Society (ASR) welded art photographic exhibition launched at the Resita Center of the Babes-Bolyai University on 22 April, 2021.

## Dimensions of exhibit

45 cm high x 22.5 cm wide x 11 cm deep







*The  
Engineer's  
Heart*  
Paul Mironov



# Photographers

**Photography as an art form arose from advancements in technology which allowed photographers to manipulate their images to fit their artistic expression.**

They are able to drastically change the outcome of an image by choosing various cameras, lenses, film, and the framing and timing of a shot. Filters, studio lighting, various darkroom processes and digital enhancement add even more tools for photographers to manipulate their images.

As researchers and development engineers at universities and companies worldwide became inspired to use emerging joining technologies to create welded art exhibits, the use of techniques such as photomicrography and electron diffraction imaging to produce art forms has been growing.

The five exhibits show a wonderful mixture of these techniques.

**SDG 12** Exhibit: Hot Track. Artist: Milan Maronek (Slovakia).

**SDG 17** Exhibit: Colour Tau. Artist: Milan Maronek (Slovakia).

**SDG 4** Exhibit: Spark. Artist: Daniel de Moraes Coelho (Brazil).

**SDG 9** Exhibit: Fishy dealings in a noir defect-ive novel. Artist: Halsey Ostergaard (Australia)

**SDG 9** Exhibit: The Edge of the World. Artist: Vladislav Yakubov (Australia).





## Milan Maronek (Slovakia)

Milan works as a professor and Head of the Department of Welding and Materials Joining at the Slovak University of Technology in Bratislava – Faculty of Materials Science and Technology. For him, photography is a kind of magic where words cannot describe what we see, feel and perceive at a given moment. He photographs through his heart and tries to make his photos look aesthetic and emotional to the viewer. The current image editing technologies give the photographer unexpected possibilities in this area. Nevertheless, he prefers composition purity and simplicity.

In his Art of Welding series, he tries to bring the viewer closer to the world of technology and welding from the perspective of fine art photography. Working with liquid metal, flame, electric arc, concentrated energy sources, or looking into the microscope eyepiece brings him an endless amount of inspiration. It then allows him to work with light tonality, colour accent and contrast, depth of field, structure and shape of objects and their motion blur to catch the viewer's eye and introduce them to the fascinating world of hidden reality.

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# SDG 12

## Ensure sustainable consumption and production patterns

12 RESPONSIBLE  
CONSUMPTION  
AND PRODUCTION



This SDG is meant to ensure good use of resources, improving energy efficiency, sustainable infrastructure, and providing access to basic services, green and decent jobs and ensuring a better quality of life for all.

Welding and related processes have been used in many ways over the years to create more sustainable products as well as increase the total life cycle of components through improved wear and corrosion resistant surfaces, resistance to failure in both extreme high and low temperature applications, ability to operate at high pressures amongst others.

The increasing use of Additive Manufacturing (AM) and its many benefits over recent decades, have contributed many economic, social and environmental successes globally. As the welding industry has embraced Additive Manufacturing, benefits have also increased quite significantly.

For example, the use of Wire Arc Additive Manufacturing (WAAM) has led to much larger and complex components being able to be manufactured with less lead times, greater efficiency, large cost savings with less materials used, less storage space, tools and machine wear, greatly reduced time to manufacture, significantly reduced energy usage and hence less carbon footprint. With less

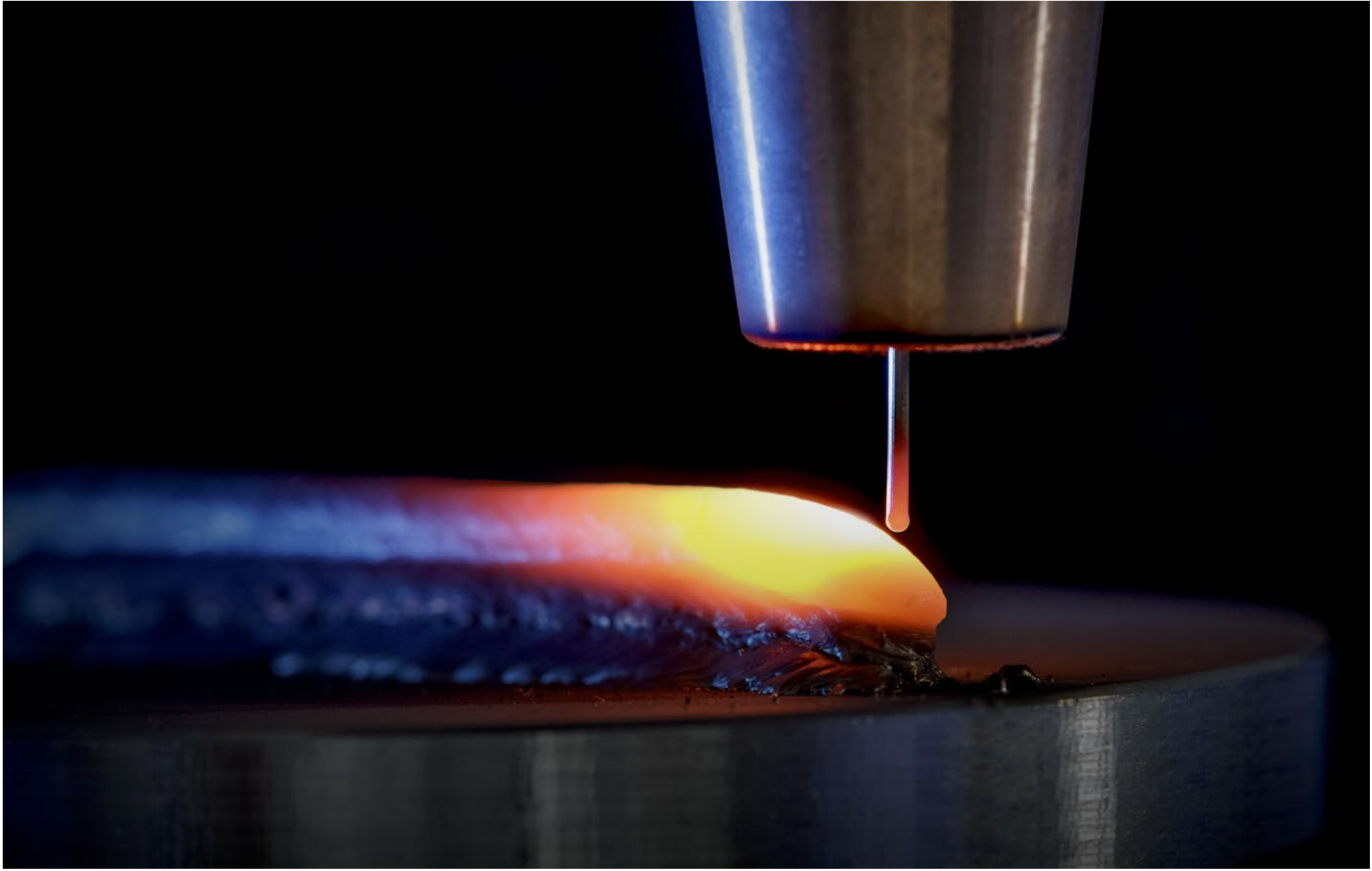
material wastage, the cost savings with more expensive materials is even more profound.

### Exhibit "Hot Track"

In the WAAM method, the component is created layer by layer by placing individual overlay beads. The heat of the electric arc is used to melt the material, which gradually spreads to the surrounding material. The human eye perceives individual wavelengths of electromagnetic radiation as colours, on the basis of which the temperature of the bead can be estimated. As it cools down, the colour gradually changes from white to yellow, orange, bright red to dark red. As a result of the high temperature of the molten weld metal, it partially flows, which with a little imagination creates the shape of a high-speed train locomotive.

The use and continuous development of such processes by the welding industry leads to reducing waste generation through prevention, reduction, recycling and reuse. It also encourages companies to adopt sustainable practices, promotes public and industry procurement practices that are sustainable and using effective communication processes, the welding industry helps ensure that people everywhere have the relevant information for sustainable development.





# SDG 17 Strengthen the means of implementation and revitalize the global partnership for sustainable development

17 PARTNERSHIPS FOR THE GOALS



A successful sustainable development agenda requires partnerships between governments, the private sector and civil society. These inclusive partnerships build upon principles and values, a shared vision, and shared goals that place people and the planet at the centre and are needed at the global, regional, national and local level. Developing multi-stakeholder partnerships to share knowledge, expertise, technology and financial support is seen as critical to overall success of the SDGs.

They are about strengthening and streamlining cooperation between nation-states, both developed and developing, using the SDGs as a shared framework and a shared vision for defining that collaborative way forward.

## Exhibit "Colour Tau"

Colour Tau is both an analogous and figurative representative of the SDG. It is a Gas Metal Arc Welding (GMAW) welded joint close-up of an aluminium anode rod with explosively welded aluminium-steel bimetal. The joint is used in electrolyzers for aluminium production and in operation, it conducts an electric current of 26,000 A. The achievement of the minimum transient resistance is a key parameter in terms of undesirable overheating of the joint. By computer image processing, the macrostructure of this combined welded joint was enhanced.

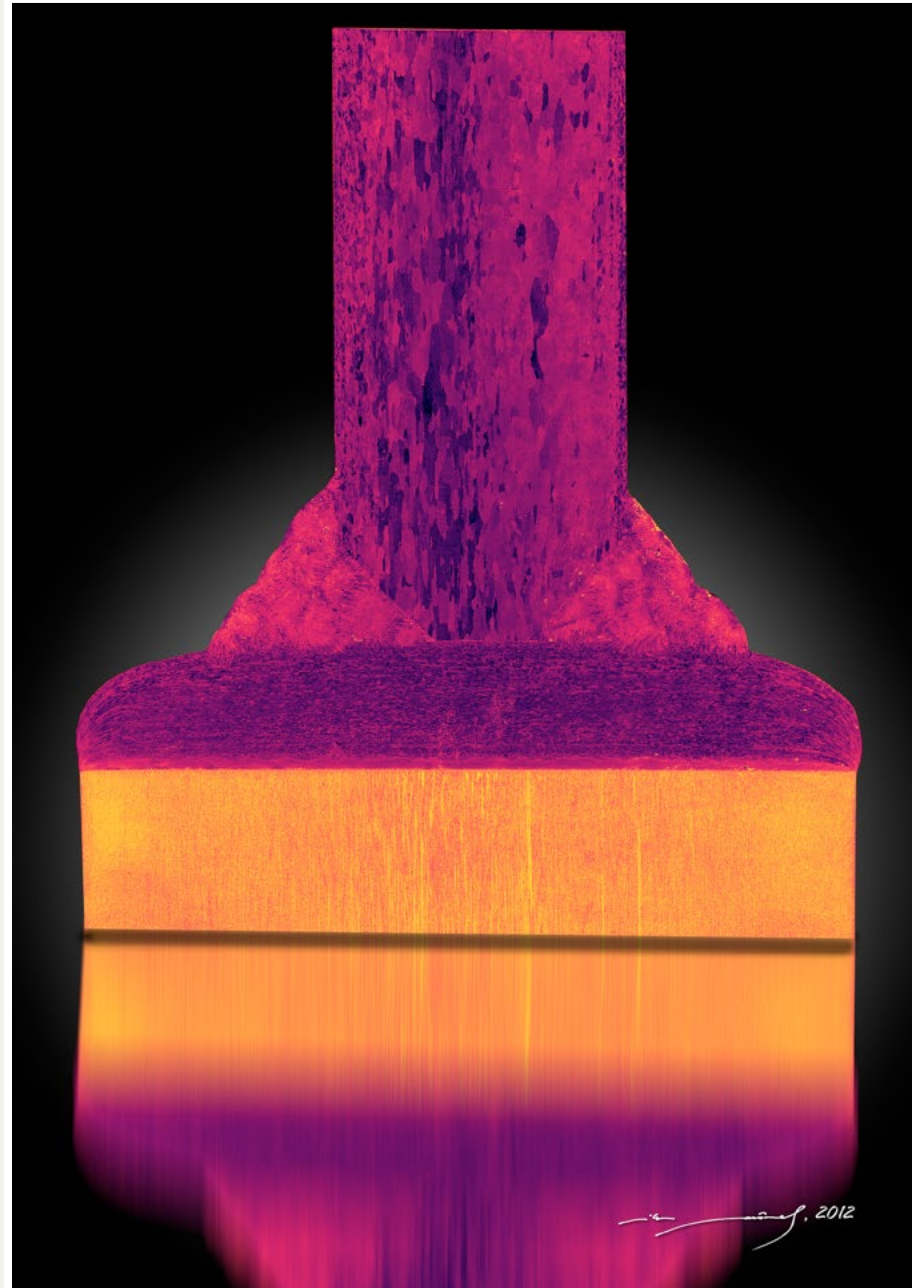
The multi-stakeholder partnerships in the SDGs to share knowledge, expertise, technology and financial support are seen as critical to their overall success and is analogous to the partnerships in the welded joint application and sustainable production of aluminium, one of the most environmentally friendly metals on earth including claimed to be infinitely recyclable.







*Colour Tau*  
Milan Maronek



## Daniel de Moraes Coelho (Brazil)

Daniel is a mechanical engineering student in the Centre for Research and Development of Welding Processes and Additive Manufacturing (LAPROSOLDA) at the Federal University of Uberlandia (UFU-Brazil). He works very closely with Prof Luiz Eduardo dos Santos Paes on research on welding processes. He developed a passion for photography related to mechanical engineering.

The role of education in ensuring sustainable development is not limited to developing regions but the whole world at large and is a force for nation building and peace. A major objective is to provide an inclusive and high-quality education that will improve the learner's standard of living and the community's future. Children and young people who gain certain skills such as reading, writing, or counting are more likely to have a better future than their peers who lack these skills.

Brazil has created and implemented numerous welding related programmes and opportunities within its networks of educational and training establishments such as Universities, National Industrial Training Service (SENAI) and the vocational education and training programmes, for lifelong learning to take place.

At the tertiary level, through university courses, workshops and conferences at places such as UFU-Brazil, training and qualification have become accessible to all people and career opportunities arise in the welding industry which can make a difference not only to Brazil but also to the world.



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# SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

4 QUALITY EDUCATION



SDG 4 has targets which include: free primary and secondary education, equal access to quality pre-primary education, affordable technical, vocational and higher education, increased number of people with relevant skills for financial success, elimination of all discrimination in education, universal literacy and numeracy, and education for sustainable development and global citizenship.

## Exhibit "Spark"

Incorrect welding parameters generate weld spatter which besides spreading over a wide area, also can have a deleterious effect on weld quality, deposition efficiency, cleaning costs and potential negative effects in service. The exhibit shows a welder executing a Gas Metal Arc Welding (GMAW) procedure with inappropriate parameters for the short-circuiting metal transfer mode.

A vibrant welding industry, a spark for transformation, generates job opportunities and economic growth, increases reliability of equipment in sectors such as food, marine and terrestrial structures, prostheses, water and energy as well as perpetuating the use of steel, a recyclable material, all to the benefit of many SDGs.







*Spark*  
Daniel de Moraes Coelho



# Vladislav Yakubov & Halsey Ostergaard (Australia)

This exhibit is part of a project funded by a Sustainable Development Goals grant at the University of Sydney led by Prof A. Paradowska to develop solid-state additive manufacturing (AM) processes for recycled aluminium alloys in collaboration with University College London (UCL), Advanced Manufacturing Research Centre (AMRC) North West, and Australian Nuclear Science and Technology Organisation (ANSTO).

Additive friction stir deposition (AFSD) fabricates structures layer-by-layer using a rotating tool piece fed with metal feedstock through a hole in the centre. No melting occurs during processing; instead, pressure and friction fuse metal in its plastic state.

AFSD provides energy-efficient, large-scale AM of a variety of alloy systems. Importantly, it can also utilize waste material from other processes, further reducing environmental impact and contributing to closing the recycling loop. This new technology has huge potential for sustainable development of large scale additive manufacturing for future civil, transport, mining and space structures.

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*Vladislav Yakubov*



*Halsey Ostergaard*



# SDG 9 Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



The aims of this SDG are to ensure sustainability and inclusivity in infrastructure development and industrialisation. One of the ways this is achieved is through research, development, and support of innovative industrial technologies.

## Exhibit "Fishy dealings in a noir defect-ive novel"

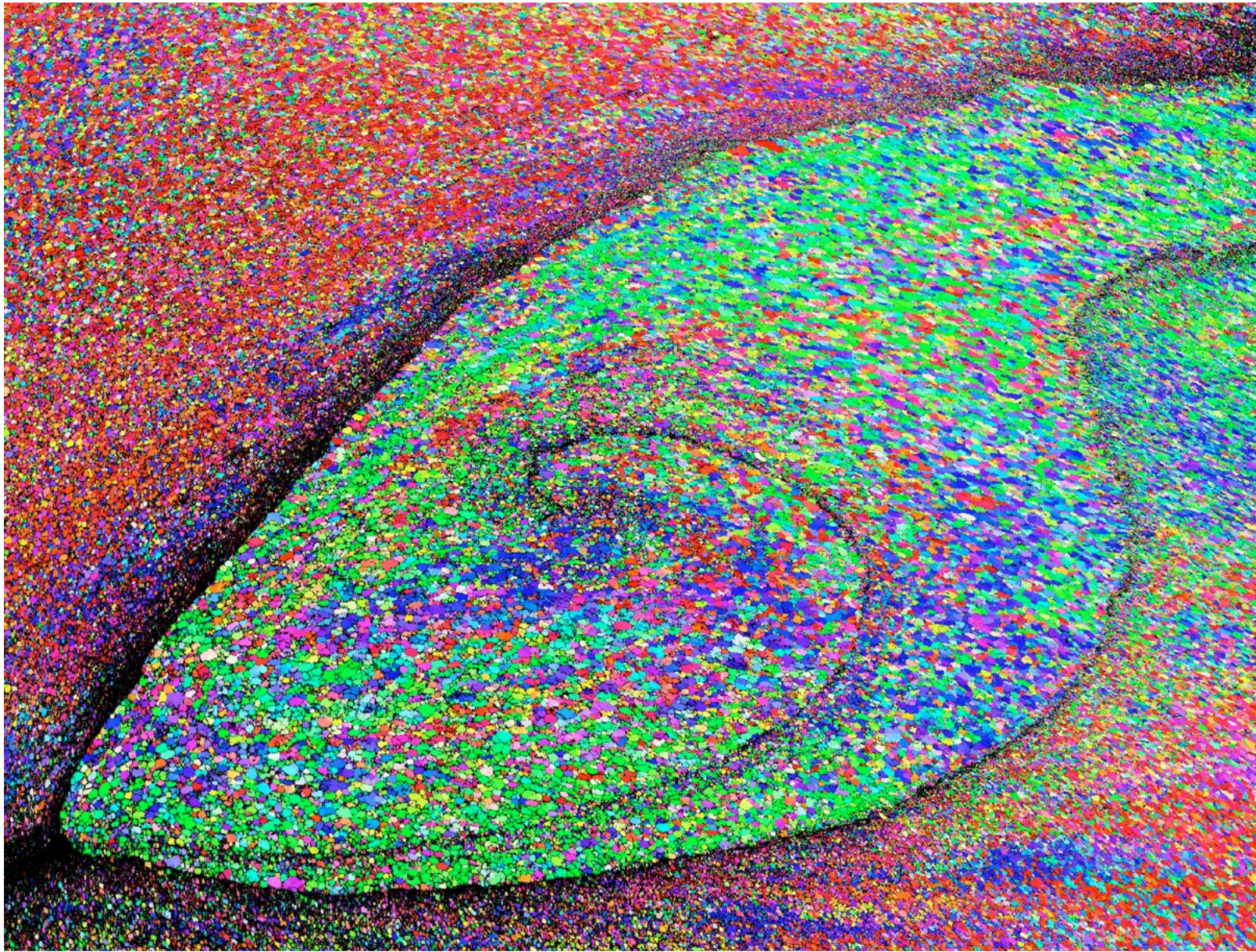
This image sets the scene for a 1930s noir detective novel complete with a fish-themed Tiffany lamp. In the background of the final scene sits a fish-themed Tiffany lamp. Scales, gills, and an eye gently illuminate the microstructure of our AFSD protagonist. The large amounts of plastic deformation during AFSD create a refined grain structure as material is extruded, swirling over the edge of the previous layer. The colours refer to the orientation of the crystal structure, mapped by electron diffraction.

## Exhibit "The Edge of the World"

This image is reminiscent of The Edge of the World (Jebel Fihrayn) which is an unexpected and dramatic geological wonder in the rocky desert northwest of Riyadh, Saudi Arabia. The site earned its nickname because from atop the escarpment, you have an uninterrupted view of the horizon. Since the material undergoes a high degree of deformation at the rotating tool head, dynamic recrystallisation (DRX) occurs, which leads to fine grain size. The electron diffraction image of the AFSD weld and build plate interface highlights the size difference between the refined AFSD grains and the cast build plate grains. Overall, these images are a beautiful example of how science and art can merge to create something mesmerising and surreal.



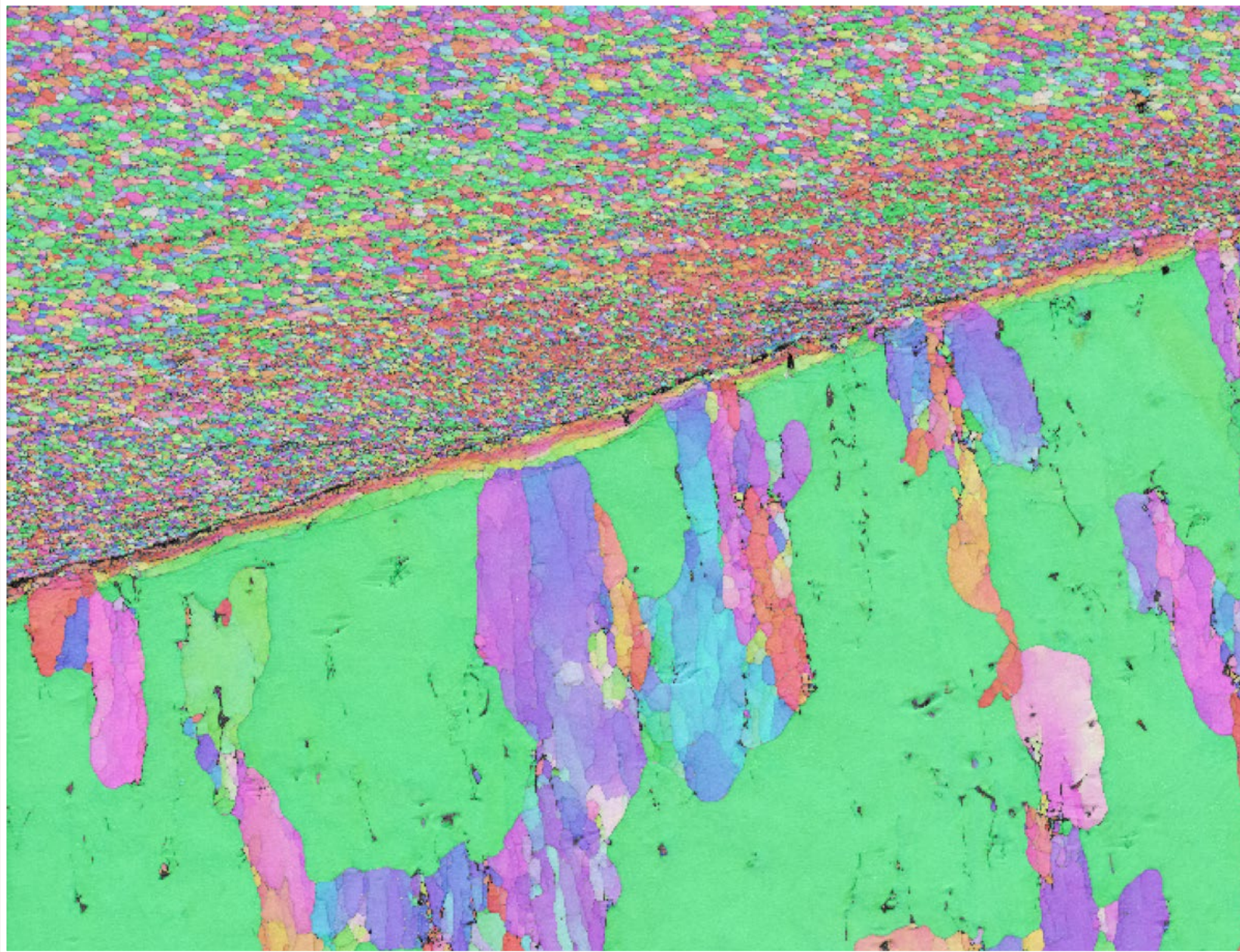




*Fishy dealings in a noir defect-ive novel*  
Halsey Ostergaard







*The Edge of the World*  
Vladislav Yakubov





# IIW Vision, Mission and Core Values

## Vision

The leading global welding community linking industry, research and education

## Mission

Advance welding and joining through a worldwide network

## Core Values

IIW is committed to the advancement of welding and joining for a safer and sustainable world

IIW operates based on mutual respect for diversity, culture and languages

*For the production of the IIW 2023 Digital Collection we would like to thank Chris Burns of A for Art Pty Ltd for his excellent layout and design skills.  
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