

CURRICULUM VITAE

Dr. Jorge F. dos Santos

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1. PERSONAL DATA

Name: Dr. dos Santos, Jorge Fernandez
Date of Birth: July 14th, 1953
Place of Birth: Rio de Janeiro - RJ, Brazil
Nationality: Brazilian
Marital Status: Single

2. ACADEMIC HISTORY

Secondary School

Ginasio Estadual Rui Bloem (1964 - 1967) (Public School Rui Bloem) São Paulo - S.P., Brazil

High School

Military College, Rio de Janeiro (1968 - 1970) (Military College of Rio de Janeiro)
Rio de Janeiro - R.J., Brazil

Graduation

Degree in Metallurgical Engineering Universidade Federal Fluminense (1971 - 1975) (Federal University of Rio de Janeiro State) Volta Redonda - R.J., Brazil

Post-Graduation

- M.Sc. Degree in Physical Metallurgy, Universidade Federal do Rio de Janeiro (Federal University of the City of Rio de Janeiro), 1976 - 1978, Rio de Janeiro - RJ, Brazil. Title: "*Weldability Analysis of Niobium Alloyed Rail Steel Welded by the Flash Butt Welding Process*"
- M.Sc. Lecture Course in Welding Technology, Cranfield University (Nov. 1978 - Sep. 1979) Cranfield - Bedford, England
- Ph.D. Degree in Welding Technology, Cranfield University (Nov. 1979 - Oct. 1983), Cranfield - Bedford, England. Title: "*Factors Affecting Transformation and Microstructure in High Strength Manual Metal Arc Weld Metals*"

3. OTHER COURSES AND CERTIFICATES

Participation on a series of short courses, seminars and workshops on the following subjects:

- Welding Technology
- Quality Assurance

- Advanced Materials
- Management related topics, including, Strategy, Organisation and Leadership aspects
- Application and Development of Software Tools
- Monitoring and Control Techniques
- Microprocessor Technology

4. TRAINEE ENGINEERING EXPERIENCE

February 1971 to February 1972 | Secretary for Economical Affairs of Rio de Janeiro / Computer Centre, Rio de Janeiro - R.J., Brazil
Cobol Programmer

June 1974 to February 1975 | Barbara Foundry Industry, Research and Development Department, Barra Mansa, R.J., Brazil
Junior Research Assistant
Participation on the following projects:

- Implementation of direct injection of CO₂ in grey iron production
- Development of calibration curves for mass spectrometry

5. PROFESSIONAL EXPERIENCE

March 1975 to December 1975 | *Institution:* Federal University of Rio de Janeiro State (UFF), Volta Redonda - R.J., Brazil
Unit: Materials Department
Position: Junior Assistant Lecturer on "Mineralogy and Ore Processing Methods" (Academic Year 1975)

January 1977 to October 1978 | *Institution:* National Steelmaking Company (CSN), Volta Redonda - R.J., Brazil
Unit: Research and Development Superintendence, Welding Department
Position: Research Assistant

	<p><i>Projects:</i></p> <p>(i) Fracture Analysis of Ferritic Steel Pipeline Welds. Research contract for the Brazilian Electricity Generation Board.</p> <p>(ii) Microstructural and Mechanical Characterisation of Heat Treated Aluminium Welded Joints. Research contract for the Brazilian Electricity Generation Board.</p> <p>(iii) Effects of Nitrogen and CO₂ as Purge Gases on Stainless Steel Pipe Welds. Research contract for the Brazilian Electricity Generation Board.</p> <p>(iv) Weldability Analysis of a C-Mn-Si Rail Steel by Flash Butt Welding. Internal R&D Project, CSN.</p>
December 1983 to July 1984	<p><i>Institution:</i> SubSea Offshore Ltd., Aberdeen, Scotland</p> <p><i>Unit:</i> Welding Division</p> <p><i>Position:</i> Welding Engineer</p> <p><i>Projects:</i></p> <p>(i) Welding procedure development and consumables evaluation for hyperbaric welding</p> <p>(ii) Fabrication of a Life Support System for a Diving Support Vessel. Welding Procedure and Welder Qualification according to ASME Sec. IX. Certified by Det Norske Veritas (DNV)</p>
July 1984 to December 1984	<p><i>Institution:</i> Subaquatica Engenharia Ltda., Rio de Janeiro - R.J., Brazil</p> <p><i>Unit:</i> Welding Department</p> <p><i>Position:</i> Welding Engineer</p> <p><i>Projects:</i></p> <p>(i) Specification and qualification of welding procedures in hyperbaric systems at simulated water depths of 20msw and 30msw</p> <p>(ii) Specification and qualification of welding procedures and welders qualification for the repairs on the legs of the PAP-1 Platform, North Coast Sector, Ceará Brazil. Qualifications according to API Std. 1104 and AWS D3.6-83</p>

- (iii) Specification of underwater wet welding procedures for:
 - Sacrificial anodes support plates and beams
 - Integration of steel columns, risers and pipelines into a cathodic protection system.
- (iv) Diving support operations and underwater inspection during launching of the North and South Pipelines Branches in São Sebastião, São Paulo, Brazil
- (v) Underwater wet welding operations involved in the maintenance of the cathodic protection system of the TORGUA Terminal, Rio de Janeiro, R.J., Brazil

January 1985 to
July 1986

Institution: Subaquatica Engenharia Ltda., Rio de Janeiro - R.J., Brazil

Unit: Technical Division

Position: Assistant to the Technical Director

Project: (i) Responsible for the welding procedure specifications and qualifications of procedures and welders in a hyperbaric system for the repairs of the PA-13 Platform, Campos Basin, Rio de Janeiro - R.J., Brazil.

(ii) Establishment of the "Research and Development Programme on Underwater Welding 1985 – 1987" to be carried out jointly by Subaquatica Engenharia and PETROBRAS S.A.

(iii) Responsible for all welding related activities concerning the "160m Welding Procedure Qualification Programme". This Programme was part of a contingency plan developed by PETROBRAS S.A. for the Campos Basin deep-water pipelines.

December 1985
to July 1986

Institution: ENGEQUAL - Consultancy on Engineering and Quality Ltd., Rio de Janeiro - R.J., Brazil

Unit: Welding Department

Position: Head of Department

Projects: (i) Co-ordinator and lecturer on the short course "Fundamentals on Welding Technology"

- (ii) Responsible for the training and qualification of welders and qualification of welding procedures for the structural repairs on the "President Costa Silva Bridge"
- (iii) Specification and Evaluation of Power Sources of a Hyperbaric Welding Simulator
- (iv) Quality Auditing of various suppliers for the offshore industry according to the CSA Standards Z 299.1 (Quality Assurance Programme Requirements) and Z 299.2 (Quality Control Programme Requirements)

August 1986 to date

Institution: **Helmholtz-Zentrum Geesthacht GmbH**, Geesthacht, Germany

Unit: Institute of Engineering (from August 1986 to December 1994)

Institute of Materials Research, Materials Mechanics (from January 1995 to date)

Positions: **Research Staff Member (from August 1986 to December 1995):**

- Responsible for the development and execution of R&D projects within the scope of HZG core research programme and research contracts
- Direct responsibility over two engineers, two technicians and a number of guest scientists

Group Manager "Joining Technology" (January 1996 to January 2009):

- Congregate, consolidate and expand HZG activities in the field of Solid-State Joining Processes
- Responsible for the development and execution of R&D projects within the scope of HZG core research programme and research contracts
- Direct responsibility over five engineers, guest scientists and students making up a group of approximately 25 persons

**Head of Department “Solid –State Joining Processes”
(January 2009 – to date)**

- Management of the State Joining Processes Dept.:
Shaping of HZG research activities in the field of Solid-State Joining Processes and transfer of this knowledge
- Representation of the Department. Establishment of Networks and acquisition of projects
- Responsible for the development and execution of R&D projects within the scope of HZG core research programme and research contracts
- Direct responsibility over 15 scientists (including staff, postdocs and PhD students) and two technicians making up a group of approximately 30 persons

6. PUBLISHED WORK

Over 380 publications in four languages have been published since 1998, whereby 71 are JCR listed and 96 are ISI listed. Presently the h-index is 19, listed in Scopus (status: 29.09.2014, searched for: AUTHOR: (dos Santos, J*) AND ADDRESS: (Geesthacht)).

Appendix Ia presents a list of JCR publications from 2009 – 2014. Appendix Ib lists the publications in proceedings in the period 2009 - 2014. In Appedix Ic the keynote and invited lectures in the period 2009 – 2014 are presented.

The summary list preseted below compiles publications from the last two years according to **knowledge areas**.

Fundamentals of Material Sciences / Metal Physics of Modern Engineering Materials, in Particular Light Metal Alloys

1. Shen, J.; Suhuddin, U.F.H.; Barbosa, M.E.B.; dos Santos, J.F.: Eutectic structures in friction spot welding joint of aluminum alloy to copper. In: Applied Physics Letters. Vol. 104 (2014) 19, 191901. (DOI: 10.1063/1.4876238)
2. Huetsch, L.L.; Huetsch, J.; Herzberg, K.; dos Santos, J.F.; Huber, N.: Increased Room Temperature Formability of Mg AZ31 by High Speed Friction Stir Processing. In: Materials and Design. Vol. 54 (2014) 980 - 988. (DOI: 10.1016/j.matdes.2013.08.108)

3. Huetsch, L.L.; Herzberg, K.; dos Santos J.F.; Huber, N.: A study on local thermal and strain phenomena of high-speed friction stir-processed Mg AZ31. In: *Welding in the world*. Vol. 57 (2013) 4, 515 - 521. (DOI: 10.1007/s40194-013-0047-1)
4. Huetsch, L.L.; Hilgert, J.; Herzberg, K.; dos Santos, J.; Huber, N.: Temperature and Texture Development during High Speed Friction Stir Processing of Magnesium AZ31. In: *Advanced Engineering Materials*. Vol. 14 (2012) 9, 762 - 771. (DOI: 10.1002/adem.201200112)
5. Suhuddin, U.; Mironow, S.; Krohn, H.; Beyer, M.; dos Santos, J.F.: Microstructural Evolution During Friction Surfacing of Dissimilar Aluminum Alloys. In: *Metallurgical and Materials Transactions A*. Vol. 43 (2012) 13, 5224 - 5231. (DOI: 10.1007/s11661-012-1345-8)
6. Suhuddin, U.F.H.; Fischer, V.; dos Santos, J.F.: The thermal cycle during the dissimilar friction spot welding of aluminum and magnesium alloy. In: *Scripta Materialia*. Vol. 68 (2013) 1, 87 - 90. (DOI: 10.1016/j.scriptamat.2012.09.008)

Process-Microstructure-Property Relationships and Their Utilization in Efficient Process Development

1. Suhuddin, U.; Fischer, V.; Kroeff, F.; dos Santos, J.F.: Microstructure and mechanical properties of friction spot welds of dissimilar AA5754 Al and AZ31 Mg alloys. In: *Materials Science and Engineering A*. Vol. 590 (2014) 384 - 389. (DOI: 10.1016/j.msea.2013.10.057)
2. Tier, M.D.; Rosendo, T.S.; dos Santos, J.F.; Huber, N.; Mazzaferro, J.A.; Mazzaferro, C.P.; Strohaecker, T.R.: The influence of refill FSSW parameters on the microstructure and shear strength of 5042 aluminium welds. In: *Journal of Materials Processing Technology*. Vol. 213 (2013) 6, 997 - 1005. (DOI: 10.1016/j.jmatprotec.2012.12.009)
3. Campanelli, L.C.; Suhuddin, U.F.H.; Antonialli, A.I.S.; dos Santos, J.F.; Alcantara, N.G.; Bolfarini, C.: Metallurgy and Mechanical Performance of AZ31 Magnesium Alloy Friction Spot Welds. In: *Journal of Materials Processing Technology*. Vol. 213 (2013) 4, 515 - 521. (DOI: 10.1016/j.jmatprotec.2012.11.002)
4. Coelho, R.S.; Kostka, A.; dos Santos, J.F.; Kaysser-Pyzalla, A.: Friction-stir dissimilar welding of aluminium alloy to high strength steels: Mechanical properties and their relation to microstructure. In: *Materials Science and Engineering A*. Vol. 556 (2012) 175 - 183. (DOI: 10.1016/j.msea.2012.06.076)

5. Rao, D.; Huber, K.; Heerens, J.; dos Santos, J.F.; Huber, N.: Asymmetric mechanical properties and tensile behaviour prediction of aluminium alloy 5083 friction stir welding joints. In: *Materials Science and Engineering A*. Vol. 565 (2013) 44 - 50. (DOI: 10.1016/j.msea.2012.12.014)
6. Richter-Trummer, V.; Suzano, E.; Beltrao, M.; Roos, A.; dos Santos, J.F.; de Castro, P.M.S.T.: Influence of the FSW clamping force on the final distortion and residual stress field. In: *Materials Science and Engineering A*. Vol. 538 (2012) 81 - 88. (DOI: 10.1016/j.msea.2012.01.016)

Development of Highly Productive Process Technologies for the Fabrication and Local Modification of Lightweight Structures;

1. Altmeyer, J.; dos Santos, J.F.; Amancio-Filho, S.T.: Effect of the friction riveting process parameters on the joint formation and performance of Ti alloy/short-fibre reinforced polyether ether ketone joints. In: *Materials and Design*. Vol. 60 (2014) 164 - 176. (DOI: 10.1016/j.matdes.2014.03.042)
2. Gandra, J.; Krohn, H.; Miranda, R.M.; Vilaca, P.; Quintino, L.; dos Santos, J.F.: Friction surfacing - A review. In: *Journal of Materials Processing Technology*. Vol. 214 (2014) 5, 1062 - 1093. (DOI: 10.1016/j.jmatprotec.2013.12.008)
3. Blaga, L.; Bancila, R.; dos Santos, J.F.; Amancio-Filho, S.T.: Friction Riveting of glass-fibre-reinforced polyetherimide composite and titanium grade 2 hybrid joints. In: *Materials and Design*. Vol. 50 (2013) 825 - 829. (DOI: 10.1016/j.matdes.2013.03.061)
4. Gabor, R.; dos Santos, J.F.: Friction stir welding development of aluminium alloys for structural connections. In: *Proceedings of the Romanian Academy : Series A*. Vol. 14 (2013) 1, 64 - 71.
5. Wang, H.; Colegrove, P.A.; dos Santos, J.F.: Hybrid modelling of 7449-T7 aluminium alloy friction stir welded joints. In: *Science and Technology of Welding and Joining*. Vol. 18 (2013) 2, 147 - 153. (DOI: 10.1179/1362171812Y.0000000078)
6. Wang, H.; Colegrove, P.A.; dos Santos, J.F.: Numerical investigation of the tool contact condition during friction stir welding of aerospace aluminium alloy. In: *Computational Materials Science*. Vol. 71 (2013) 101 - 108. (DOI: 10.1016/j.commatsci.2013.01.021)

7. Hilgert, J.; dos Santos, J.F.; Huber, N.: Shear layer modelling for bobbin tool friction stir welding. In: Science and Technology of Welding and Joining. Vol. 17 (2012) 6, 454 - 459. (DOI: 10.1179/1362171812Y.0000000034)

Implementation of the Newly Developed Processes in Technologies and Products, Ideally in Cooperation with Industry

1. Dethlefs, A.; Roos, A.; dos Santos, J.F.; Wimmer, G.: Hybrid Friction Diffusion Bonding of Aluminium Tube-to-Tube-Sheet Connections in Coil-Wound Heat Exchangers. In: Materials and Design. Vol. 60 (2014) 7 - 12. (DOI: 10.1016/j.matdes.2014.03.049)
2. Feistauer, E.E.; Bergmann, L.A.; Barreto, L.S.; dos Santos, J.F.: Mechanical behaviour of dissimilar friction stir welded tailor welded blanks in Al-Mg alloys for Marine applications. In: Materials and Design. (2014) 323 - 332. (DOI: 10.1016/j.matdes.2014.02.042)
3. Richter-Trummer, V.; Koch, D.; Witte, A.; dos Santos, J.F.; de Castro, P.M.S.T.: Methodology for prediction of distortion of workpieces manufactured by high speed machining based on an accurate through-the-thickness residual stress determination. In: The International Journal of Advanced Manufacturing Technology. Vol. 68 (2013) 9-12, 2271 - 2281. (DOI: 10.1007/s00170-013-4828-x)
4. Hanke, S.; Beyer, M.; Silvonen, A.; dos Santos, J.F.; Fischer, A.: Cavitation erosion of Cr60Ni40 coatings generated by friction surfacing. In: Wear . Vol. 301 (2013) 1-2, 415 - 423. (DOI: 10.1016/j.wear.2012.11.016)

7. PATENTS

Appendix II (partially in German language) presents a list of applied and granted patents from 1999 to date. In total, 19 patents have been granted and 17 are currently in evaluation process. These patents are concerned with advanced fabrication processes, technologies and equipment as well as specific applications making use of these processes, technologies and equipment.

8. PROJECTS

Remarks:

- The list below presents a summary compilation of projects in which I have been fully or partly responsible for the development of the project idea and consortium (when applicable), preparation of the proposal and work

programme (scientific, technical and administrative). Furthermore, I have also been fully or partly responsible for HZG's duties in the scientific and technical co-ordination and realisation of these projects.

- The compilation presented below has been ordered according to the **knowledge areas** listed in the joint call for applications from the Leuphana Universität Lüneburg and the Helmholtz-Zentrum Geesthacht.
- Appendix III presents a complete list of projects according to the funding modality. This compilation includes the Helmholtz Research Programme and institutionally funded projects, carried out from 1986 to date. Furthermore, selected projects, carried out as research contracts (with a contractual value higher than Euro 100.000), have also been considered. Some industrial research contracts have not been mentioned for confidentiality reasons.

Fundamentals of Material Sciences / Metal Physics of Modern Engineering Materials, in Particular Light Metal Alloys

2007 to 2011	<p><i>Title:</i> Improving Performance and Productivity of Integral Structures through Fundamental Understanding of Metallurgical Reactions in Metallic Joints – Virtual Institute (VI-IPSUS) (A Programme funded by the Helmholtz Association)</p> <p><i>Coordinator</i></p>
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Process-Microstructure-Property Relationships and Their Utilization in Efficient Process Development

1993 to 1995	<p><i>Title:</i> HZG Core Research Programme: Microstructural and Mechanical Properties of Hyperbaric GMA Ferritic Weld Metals Deposited in the Pressure Range from 51 to 110bar</p>
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2002 to 2005	<p><i>Title:</i> HZG Core Research Programme: Topic 2 “Integrity and Joining of Advanced Light-Weight Structures”</p>
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2002 to 2005	<i>Title:</i>	Effect of Material Flow Pattern on the Properties of Friction Stir Welds in Al Alloys for Aircraft Structures (EMFASIS). Research Contract conducted for AIRBUS, Bremen, Germany
2004 to 2007	<i>Title:</i>	European Project: Solving Welding Problems By The Use Of Friction Stir – "SOLVSTIR" (European Project: RFS-PR-03-077 / Research Fund for Steel and Coal)
		Coordinator
2006 to 2010	<i>Title:</i>	European Project: Cost Effective Integral Metallic Structure – "COINS" (European Project: AST5-CT-030825)
		Task Leader
2011 to 2014	<i>Title:</i>	Friction Stir Welding of Shipbuilding Steels, research contract conducted for Petrobras S.A., Rio de Janeiro, Brazil

Development of Highly Productive Process Technologies for the Fabrication and Local Modification of Lightweight Structures;

1995 to 2002	<i>Title:</i>	HZG Core Research Programme: Thematic Area "Advanced Joining Technologies for Light Weight Structures"
2005 to date	<i>Title:</i>	HZG Core Research Programme: Advancing Engineering Materials (AEM): 2005 – 2009: Topic 2 "Multi-Material System" 2010 – 2014: Topic 2 "Mechanics and Joining" 2014 – 2019: Topic 2 "Hybrid and Functionalised"

2000 to 2003	<p>Structures”</p> <p><i>Title:</i> <u>European Project:</u> Welding of Airframes using Friction Stir – "WAFS" (European Project: GROWTH Project GRD1-1999-10271)</p> <p><i>Task Leader</i></p>
2001 to 2003	<p><i>Title:</i> <u>European Project:</u> Friction Surfacing for Multi-Sectorial Applications – "FRICSURF " (European Project: CRAFT-1999-70658)</p> <p><i>Task Leader</i></p>
2003 to 2005	<p><i>Title:</i> <u>European Project:</u> Development of an Interactive Process Technology Database and Design Guidelines for Friction Stir Welding of Lightweight Materials – "DIPLOMAT" (European Project: -G1ST-CT-2002-50279 / Craft Programme)</p> <p><i>Scientific Coordinator</i></p>
2008 to 2010	<p><i>Title:</i> Metal Friction Surface Welding, research contract conducted for Ford Research Centre, Aachen, Germany)</p>
2012 to 2015	<p><i>Title:</i> <u>European Project:</u> Strengthen International Research Collaborations on the Development of Functional Surfaces between the EU, Brazil and Mexico – “FUNCTIONAL” (Marie Curie Actions “People”: 295254)</p> <p><i>Task Leader</i></p>
2013 to 2015	<p><i>Title:</i> Entwicklung des Reibauftragsschweiß-Verfahrens für die Anwendung in der Öl & Gas Industrie a project funded by the “Programm des Projektbezogenen Personalaustauschs (PPP) mit Brasilien”</p>

(DAAD/PROBRAL)

Implementation of the Newly Developed Processes in Technologies and Products, Ideally in Cooperation with Industry

2002 to 2005	<i>Title:</i>	Evaluation of the Friction Stir Welding Process for Application in Medium Sized Commercial Aircraft. Research Contract conducted for EMBRAER, Brazil
2004 to 2007	<i>Title:</i>	Weiterentwicklung des FSW Verfahrens für die Anwendung in Flugzeugstrukturen (IMER), research contract conducted for AIRBUS, Bremen, Germany
2007 to 2010	<i>Title:</i>	Stir Welded Blanks for Innovative Integral Aircraft Structures (SIRIUS), research contract conducted for AIRBUS, Bremen, Germany
2007 to 2010	<i>Title:</i>	Innovative Fertigungsmethoden für integrale Leichtbaustrukturen aus neuen Werkstoffen mit unterschiedlichen Eigenspannungszuständen (IMAGINE), research contract conducted for Witte Gerätebau GmbH, Barskamp, Germany
2009 to 2011	<i>Title:</i>	Study on the Application of Friction Surfacing on Valve and Valve Seat, research contract conducted for Wärtsilä Corporation, Helsinki, Finland
2009 to 2012	<i>Title:</i>	Prozesseffizienter metallischer Rumpf (Process Optimization for Metallic Fuselage – PROMET), a programme funded by the German Ministry of Industry and Commerce (BMWi), as part of the LuFo IV Research Initiative

2010 to 2014	<i>Title:</i>	Friction Stir Welding of new Integral Aircraft Structures , research contract conducted for EMBRAER, São José dos Campos, Brazil
2010 to 2012	<i>Title:</i>	Rührreibgeschweißte Leichtbaustrukturen für Schiffsaufbauten – “FSW-Ship” , a programme funded by the German Ministry of Industry and Commerce (BMWi)
2011 to 2013	<i>Title:</i>	Advanced and Innovative Repair Technologies (AIRtech) , research contract conducted for Lufthansa Technik, Hamburg, Germany
2011 to 2014	<i>Title:</i>	Entwicklung, Fertigung und Erprobung einer Robotik FSW-Einheit mit Stationärer Schulter für die Anwendung in Fahrzeugstrukturen , research contract conducted for Mercedes Benz, Untertürkheim, Germany
2014 to 2016	<i>Title:</i>	Friction Stir Welding for Thick Plates of Different Aluminium Alloys for Wing Applications , research contract conducted for EMBRAER, SJC, Brazil)

9. LECTURING ACTIVITIES

(a) University Hamburg, Institute of Naval Architecture Hamburg, Germany.

Unit: Naval Architecture
Position: Guest Lecturer
Subject: Underwater Technology II
Course: Graduation Course
Period: 1994 to 1998 (summer semester only)
Hours/week: 2 hours/week, 14 weeks/semester

(b) Technical University Hamburg-Harburg, Degree Course in Naval Architecture Hamburg, Germany.

Unit: Naval Architecture
Position: Guest Lecturer
Subject 1: Underwater Technology II
Subject 2: Welding Technology II
Course: Graduation Course
Period: 1999 to 2003 (summer semester only)
Hours/week: 2 hours/week, 14 weeks/semester

(b) University of Applied Sciences Kiel, Mechanical Engineering, Kiel, Germany.

Unit: Mechanical Engineering
Position: Guest Lecturer
Subject: Welding Technology
Course: Graduation Course
Period: 1996 – 1998 (summer and winter semesters)
Hours/week: 3 hours/week, 14 weeks/semester

10. SUPERVISION OF ACADEMIC AND SCIENTIFIC WORK

8.1 Graduation, Bachelor and MSc Thesis

More than 200 students have conducted their graduation, bachelor or MSc thesis under my responsibility or direct supervision. The majority of these students originated from the following Universities:

- Hamburg University, Institute for Naval Architecture, Germany
- Technical University Hamburg-Harburg, Germany
- Technical University of Braunschweig, Germany
- University of Applied Sciences of Hamburg, Germany
- University of Rostock, Germany
- Kiel University of Applied Sciences, Germany
- Flensburg University of Applied Sciences, Germany
- Bremen University of Applied Sciences, Germany
- Darmstadt University of Applied Sciences, Germany
- Ecole Centrale de Nantes, France
- Cranfield University, England
- Instituto Superior Técnico, Portugal
- University of South Carolina, South Carolina, USA
- Universidade Federal de São Carlos, Brazil
- Univesidade Federal do Rio Grande do Sul, Brazil
- Univesidade Federal do Ceara, Brazil
- Universidade Federal de Sergipe, Brazil
- UNiversidade Federal de Pernambuco, Recife, Brazil
- ICAM, Nantes, France
- ICAM, Lille, France
- Università degli Studi di Genova, Genoa, Italy
- University of Maribor, Maribor, Slovenia
- Università di Pisa, Pisa, Italy

8.2 PhD Students

CO-SUPERVISION:

Valter Rocha, Influences of the Oxygen in the Shielding Gas on Properties of Hyperbaric Gas Metal Arc Weldments Down to 111 bar, PhD Thesis presented at Federal University Rio de Janeiro, August 2001

Celso Ribeiro, Application of Low Vacuum Electrom Beam Welding in Supermartensitic Stainless Steels, PhD Thesis presented at Universidade Federal de São Carlos, August 2003

Liane Roldo, Microstructure and mechanical properties of friction stir welded Al alloy 6056 in T4 e T6 temper conditions, PhD Thesis presented at Universidade Federal do Rio Grande do Sul, Porto Alegre, August 2004

Pedro Vilaça, Process Fundamentals of Friction Stir Welding - Experimental Analysis and Analytical Modelling, PhD Thesis presented at Instituto Superior Tecnico, Lisbon, September 2003

Cintia Mazzaferro, Friction Spot Welding of a TRIP 800 steel: process, microstructure and properties, PhD Thesis presented at Universidade Federal do Rio Grande do Sul, Porto Alegre, December 2008

Fabiano Dornelles, Structure / Property Relationships in Similar and Dissimilar Friction Stir Spot Welds, PhD Thesis presented at Universidade Federal do Rio Grande do Sul, Porto Alegre, December 2008

Tonilson Rosendo, An analysis of the mechanical performance of an Al alloy 6181-T4, PhD Thesis presented at Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil, March 2009

Telmo J.G. Santos, Non-destructive testing by eddy current: development and application to frictions stir welds, PhD thesis presented at the Instituto Superior Tecnico, Lisbon, Portugal, June 2009

Marcio Levi Kramer de Macedo, Characterisation of High Carbon Steel Layers Deposited by Friction Surfacing, Federal University of Rio Grande do Sul, Brazil, March 2011.

Sergio Tavares, Design and Advanced Manufacturing of Aircraft Structures using Friction Stir Welding, Universidade do Porto, Porto, Portugal, July 2011

Toni Roger Schifelhain de Lima, Development of a Methodology to Generate Crack Resistance Curves (R-Curves) of Elasto Plastic Materials through the Analysis of Deformation Fields at the Crack Tip, Federal University of Rio Grande do Sul, Brazil, December 2011

Valentin Richter-Trummer, Residual stress effects and damage tolerance behaviour of integral lightweight structures manufactured by FSW and HSM, Universidade do Porto, Porto, Portugal, January 2012

Roger Navarro Verastegui, A Study on Steel / Aluminium Dissimilar Joints produced by Friction Spot Welding, Federal University of Rio Grande do Sul, Brazil, June 2012

Gabriel Pieta, Application of the Friction Spot Welding Process in Aircraft Structures: Optimisation of Process Parameters and Integrity Assessment of Joints in Al 2198-T8, Federal University of Rio Grande do Sul, Brazil, December 2013

SCIENTIFIC SUPERVISION

Axel Meyer, Friction Hydro Pillar Processing Bonding Mechanism and Properties, PhD Thesis presented at Technische Universität Carolo-Wilhelmina zu Braunschweig, March 2003

Silvia Lomolino, Fatigue strength and mechanical properties of friction stir welded butt joints on 6056-T4 Al-alloy, Univesitat di Ferrara, Ferrara, Italien, March 2005

Luisa Marzoli, "Mechanical characterisation of friction stir welding joints for naval application", PhD Thesis presented at University of Genoa, Genoa, Italy, February 2005

Antonio M. da Silva, An investigation on the Structure/Property Relationships of Solid State Welding Processes in a Titanium Matrix Composite Alloy (TiAl4V + 10 wt.% of TiC): PhD Thesis presented at Universität Duisburg-Essen, Janaury 2006

Shahram Sheikhi, Herstellung und Bewertung der Unformbarkeit von reibrührgeschweißten Tailored Blanks aus Aluminiumlegierungen, PhD Thesis presented at Universität Duisburg-Essen, March 2006

Sergio Amancio, Friction Riveting: development and analysis of a new joining technique for polymer-metal multi-materials structures, PhD Thesis presented at Technische Universität Hamburg-Harburg, May 2007

Gustavo Pinheiro, Friction Hydro Pillar Processing of Lightweight Alloys: Bonding Mechanisms and Joint Properties, PhD Thesis presented at Technische Universität Hamburg-Harburg, March 2008

Cesar W. Olea, Influence of the FSW Energy Input on Structural Evolution and mechanical behaviour of Precipitation Hardening Al Alloys, PhD Thesis presented at Universität Bochum, June 2008

Thomas Neumann, Friction stir welding of Al 2024-T351 using a self-reacting bobbin tool, PhD Thesis presented at Technische Universität Ilmenau, February, 2009

Ramona Florentina Gabor, Application of Friction Stir Welding in Civil Engineering, University Polytechnic of Timisoara, January 2010

Arne Roos, Hybrid Friction Diffusion Bonding (HFDB) Prozess - Grundlagen und Eigenschaften der Verbindungen, PhD Thesis presented at Technische Universität Ilmenau, March 2010

Jakob Hilgert, Knowledge Based Process Development of Bobbin Tool Friction Stir Welding, Technical University Hamburg-Harburg, July 2012

11. INTERNATIONAL CO-OPERATION

In the course of my activities in the past 25 years I have developed a series of co-operations with foreign industrial and academic institutions. In these international co-operations I have been appointed as co-ordinator for HZG as well as for the development and management of individual projects within the co-operation.

- NEOS Robotics AB, Tåby, Sweden
- PETROBRAS S.A., Rio de Janeiro, Brazil
- Federal University of São Carlos / Centre for Characterisation and Development of Material (CCDM), São Carlos, Brazil
- Institut de Soudure, Paris, France
- Federal University of Rio Grande do Sul, Porto Alegre, Brazil
- Università degli Studi di Genova, Genoa, Italy
- Federal University of Ceara, Ceara, Brazil
- Federal University of Sergipe, Sergipe, Brazil
- University of Maribor, Slovenia
- COMIMSA, Santillo, Mexico
- Loxin, Spain

12. PARTICIPATION IN COMMITTEES, COMMISSIONS AND WORKING GROUPS

(a) International Institute of Welding (IIW)

Chairman of the Sub-Commission IX-NF "Weldability of Non-Ferrous Metals"

Chairman of the Sub-Commission III-B "Friction Based Joining Processes"

(b) American Society for Mechanical Engineering (ASME)

June 1991 to 2000

Member of the Technical Committee and Editorial Board (Conference) of the Offshore Mechanical and Arctic Engineering Division.

(c) German Welding Society (Deutscher Verband für Schweißtechnik - DVS)

October 1992 to February 1998

Vice-President of the Working Group AA16.3/AG-V4 Underwater Welding and Cutting.

(d) International Society for Offshore and Polar Engineering

June 1991 to May 1996

Member of the Technical Committee and Editorial Board of the "International Conference on Offshore and Polar Engineering"

13. LANGUAGES

- Read: German, English, Portuguese, Spanish, Italian and French
- Speak: German, English, Portuguese, Spanish
- Write: German, English, Portuguese, Spanish

14. PRIZES AND DISTINCTIONS

- (a) **"Metal Leve" Prize for Metallurgical Engineering - Year 1975.**
Awarded for the high performance achieved during the Metallurgical Engineering Course (Graduation)
- (b) **Prize "Oxigenio do Brasil" - Year 1978.** Awarded for the paper "Weldability Analysis of a Nb-Alloyed Rail Steel Welded by Thermit Welding", presented at the 1977 Annual Assembly of the Brazilian Association for Metals, São Paulo, S.P
- (c) **Offshore Mechanics and Arctic Engineering Achievement Award - Year 1992.**
Awarded by the ASME (American Society for Mechanical Engineers) for the valued services to the Offshore Mechanics and Arctic Engineering Division
- (d) **Best Paper Award – 1993** The International Society of Offshore and Polar Engineers. Awarded for the paper: "Automatic and Diverless Underwater Welding: New Systems and Concepts"
- (e) **Offshore Mechanics and Arctic Engineering Achievement Award - Year 1997.**
Awarded by the ASME (American Society for Mechanical Engineers) for the valued services to the Offshore Mechanics and Arctic Engineering Division
- (f) **Best Poster Award** of the 5th International Conference on Trends in Welding Research, 1998
- (g) **Research and Development Award 1999.** Awarded by the Society of Friends of the GKSS Forschungszentrum for the work carried out in the area of advanced friction welding processes
- (h) **Best Paper Award** at the 1st International Joint Symposium on Joining and Welding Friction Based Welding & Processing, 6-8 November, 2013, Osaka, Japan, "Investigations of microstructural, thermal and local strain phenomena of high speed friction stir processed Mg AZ31", by L. L. Hütsch, J.F. dos Santos, and N. Huber

15. PROFESSIONAL ASSOCIATIONS

- **Chartered Engineer (February, 1989)**
Registration Number: 392645
- **Welding and Joining Society / TWI**
Status: Professional Member (SenMWeldl)
Member Number: D0773
Member since: 1976
- **The Institute of Material (IOM)**
Status: Professional Member (MIM)
Member Number: 0022816
Member since: 1986
- **Deutscher Verband für Schweißtechnik (DVS) – German Welding Society**
Status: Member
Member Number: 001 33887.05
Member since: 1986
- **Deutsche Gesellschaft für Materialkunde (DGM) - German Society for Metallurgy**
Status: Member
Member Number: 14324
Member since: 1993
- **The Minerals, Metals and Materials Society (TMS)**
Status: Member
Member Number: 401874
Member since: 1997
- **Technical Society for Shipbuilding (Schiffbautechnische Gesellschaft e.V.)**
Status: Member
Member Number: 5010
Member since: 1998
- **Association of German Engineers (Vereins Deutscher Ingenieure – VDI)**
Status: Member
Member Number: 10018421
Member since: 2010

16. HOBBIES AND OTHER INTERESTS

- **Music**
- **Motor Sport**
- **Photography**

17. COMPLEMENTARY PERSONAL INFORMATION

Passport Details:

Number: YB389526
Authority: Brazilian Consulate / Berlin
Place of Issue: Berlin, Germany
Date of Issue: 14nd October 2008
Validity: 13rd October 2013

Working/Living Permission in Germany:

Aufenthaltstitel-Number: YORWF8TJ8
Authority: Stadt Lüneburg, Ausländerbehörde
Date: 29th August 1996
Validity: Indefinite

Business Address:

Helmholtz-Zentrum Geesthacht
Institute of Materials Research,
Materials Mechanics,
Solid-State Joining Processes
Max-Planck-Str. 1
D-21502 Geesthacht, Germany.
Tel.: +49 - 4152 - 872050
Fax: +49 - 4152 - 872033
e-mail: jorge.dos.santos@hzg.de

Residential Address

Deichstr. Ost 20
D-21395 Tespe, Germany.
Mobile: +49 – 170 – 8918122

Appendix Ia: List of JCR Publications in the period 2009 - 2014

2014

1. Altmeyer, J.; dos Santos, J.F.; Amancio-Filho, S.T.: Effect of the friction riveting process parameters on the joint formation and performance of Ti alloy/short-fibre reinforced polyether ether ketone joints. In: *Materials and Design*. Vol. 60 (2014) 164 - 176. (DOI: 10.1016/j.matdes.2014.03.042)
2. Dethlefs, A.; Roos, A.; dos Santos, J.F.; Wimmer, G.: Hybrid Friction Diffusion Bonding of Aluminium Tube-to-Tube-Sheet Connections in Coil-Wound Heat Exchangers. In: *Materials and Design*. Vol. 60 (2014) 7 - 12. (DOI: 10.1016/j.matdes.2014.03.049)
3. Feistauer, E.E.; Bergmann, L.A.; Barreto, L.S.; dos Santos, J.F.: Mechanical behaviour of dissimilar friction stir welded tailor welded blanks in Al-Mg alloys for Marine applications. In: *Materials and Design*. (2014) 323 - 332. (DOI: 10.1016/j.matdes.2014.02.042)
4. Shen, J.; Suhuddin, U.F.H.; Barbosa, M.E.B.; dos Santos, J.F.: Eutectic structures in friction spot welding joint of aluminum alloy to copper. In: *Applied Physics Letters*. Vol. 104 (2014) 19, 191901. (DOI: 10.1063/1.4876238)

2013

5. Blaga, L.; Bancila, R.; dos Santos, J.F.; Amancio-Filho, S.T.: Friction Riveting of glass-fibre-reinforced polyetherimide composite and titanium grade 2 hybrid joints. In: *Materials and Design*. Vol. 50 (2013) 825 - 829. (DOI: 10.1016/j.matdes.2013.03.061)
6. Gabor, R.; dos Santos, J.F.: Friction stir welding development of aluminium alloys for structural connections. In: *Proceedings of the Romanian Academy : Series A*. Vol. 14 (2013) 1, 64 - 71.
7. Gandra, J.; Krohn, H.; Miranda, R.M.; Vilaca, P.; Quintino, L.; dos Santos, J.F.: Friction surfacing - A review. In: *Journal of Materials Processing Technology*. Vol. 214 (2014) 5, 1062 - 1093. (DOI: 10.1016/j.jmatprotec.2013.12.008)
8. Huetsch, L.L.; Herzberg, K.; dos Santos, J.F.; Huber, N.: A study on local thermal and strain phenomena of high-speed friction stir-processed Mg AZ31. In: *Welding in the world*. Vol. 57 (2013) 4, 515 - 521. (DOI: 10.1007/s40194-013-0047-1)

9. Huetsch, L.L.; Huetsch, J.; Herzberg, K.; dos Santos, J.F.; Huber, N.: Increased Room Temperature Formability of Mg AZ31 by High Speed Friction Stir Processing. In: *Materials and Design*. Vol. 54 (2014) 980 - 988. (DOI: 10.1016/j.matdes.2013.08.108)
10. Richter-Trummer, V.; Koch, D.; Witte, A.; dos Santos, J.F.; de Castro, P.M.S.T.: Methodology for prediction of distortion of workpieces manufactured by high speed machining based on an accurate through-the-thickness residual stress determination. In: *The International Journal of Advanced Manufacturing Technology*. Vol. 68 (2013) 9-12, 2271 - 2281. (DOI: 10.1007/s00170-013-4828-x)
11. Suhuddin, U.; Fischer, V.; Kroeff, F.; dos Santos, J.F.: Microstructure and mechanical properties of friction spot welds of dissimilar AA5754 Al and AZ31 Mg alloys. In: *Materials Science and Engineering A*. Vol. 590 (2014) 384 - 389. (DOI: 10.1016/j.msea.2013.10.057)
12. Tier, M.D; Rosendo, T.S; dos Santos, J.F.; Huber, N.; Mazzaferro, J.A.; Mazzaferro, C.P.; Strohaecker, T.R.: The influence of refill FSSW parameters on the microstructure and shear strength of 5042 aluminium welds. In: *Journal of Materials Processing Technology*. Vol. 213 (2013) 6, 997 - 1005. (DOI: 10.1016/j.jmatprotec.2012.12.009)
13. Wang, H.; Colegrove, P.A.; dos Santos, J.F.: Hybrid modelling of 7449-T7 aluminium alloy friction stir welded joints. In: *Science and Technology of Welding and Joining*. Vol. 18 (2013) 2, 147 - 153. (DOI: 10.1179/1362171812Y.0000000078)
14. Wang, H.; Colegrove, P.A.; dos Santos, J.F.: Numerical investigation of the tool contact condition during friction stir welding of aerospace aluminium alloy. In: *Computational Materials Science*. Vol. 71 (2013) 101 - 108. (DOI: 10.1016/j.commatsci.2013.01.021)

2012

8. Abibe, A.B.; Amancio-Filho, S.T.; dos Santos, J.F.; Hage, E.jr.: Mechanical and failure behaviour of hybrid polymer–metal staked joints. In: *Materials and Design*. Vol. 46 (2013) 338 - 347. (DOI: 10.1016/j.matdes.2012.10.043)
9. Campanelli, L.C.; Suhuddin, U.F.H.; Antonialli, A.I.S.; dos Santos, J.F.; Alcantara, N.G.; Bolfarini, C.: Metallurgy and Mechanical Performance of AZ31 Magnesium Alloy Friction Spot Welds. In: *Journal of Materials Processing Technology*. Vol. 213 (2013) 4, 515 - 521. (DOI: 10.1016/j.jmatprotec.2012.11.002)

10. Coelho, R.S.; Kostka, A.; dos Santos, J.F.; Kaysser-Pyzalla, A.: Friction-stir dissimilar welding of aluminium alloy to high strength steels: Mechanical properties and their relation to microstructure. In: *Materials Science and Engineering A*. Vol. 556 (2012) 175 - 183. (DOI: 10.1016/j.msea.2012.06.076)
11. Hanke, S.; Beyer, M.; Silvonen, A.; dos Santos, J.F.; Fischer, A.: Cavitation erosion of Cr60Ni40 coatings generated by friction surfacing. In: *Wear* . Vol. 301 (2013) 1-2, 415 - 423. (DOI: 10.1016/j.wear.2012.11.016)
12. Hilgert, J.; dos Santos, J.F.; Huber, N.: Shear layer modelling for bobbin tool friction stir welding. In: *Science and Technology of Welding and Joining*. Vol. 17 (2012) 6, 454 - 459. (DOI: 10.1179/1362171812Y.0000000034)
13. Huetsch, L.L.; Hilgert, J.; Herzberg, K.; dos Santos, J.; Huber, N.: Temperature and Texture Development during High Speed Friction Stir Processing of Magnesium AZ31. In: *Advanced Engineering Materials*. Vol. 14 (2012) 9, 762 - 771. (DOI: 10.1002/adem.201200112)
14. Rao, D.; Huber, K.; Heerens, J.; dos Santos, J.F.; Huber, N.: Asymmetric mechanical properties and tensile behaviour prediction of aluminium alloy 5083 friction stir welding joints. In: *Materials Science and Engineering A*. Vol. 565 (2013) 44 - 50. (DOI: 10.1016/j.msea.2012.12.014)
15. Richter-Trummer, V.; Suzano, E.; Beltrao, M.; Roos, A.; dos Santos, J.F.; de Castro, P.M.S.T.: Influence of the FSW clamping force on the final distortion and residual stress field. In: *Materials Science and Engineering A*. Vol. 538 (2012) 81 - 88. (DOI: 10.1016/j.msea.2012.01.016)
16. Suhuddin, U.; Mironow, S.; Krohn, H.; Beyer, M.; dos Santos, J.F.: Microstructural Evolution During Friction Surfacing of Dissimilar Aluminum Alloys. In: *Metallurgical and Materials Transactions A*. Vol. 43 (2012) 13, 5224 - 5231. (DOI: 10.1007/s11661-012-1345-8)
17. Suhuddin, U.F.H.; Fischer, V.; dos Santos, J.F.: The thermal cycle during the dissimilar friction spot welding of aluminum and magnesium alloy. In: *Scripta Materialia*. Vol. 68 (2013) 1, 87 - 90. (DOI: 10.1016/j.scriptamat.2012.09.008)

2011

18. Amancio-Filho, S.T.; Camillo, A.P.C.; Bergmann, L.; dos Santos, J.F.; Kury, S.E.; Machado, N.G.A.: Preliminary Investigation of the Microstructure and Mechanical Behaviour of 2024 Aluminium Alloy Friction Spot Welds. In: *Materials Transactions*. Vol. 52 (2011) 5, 985 - 991.

19. Amancio, S.T.; Bueno, C.; dos Santos, J.F.; Huber, N.; Hage, E.jr.: On the feasibility of friction spot joining in magnesium/fiber-reinforced polymer composite hybrid structures. In: *Materials Science and Engineering A*. Vol. 528 (2011) 10-11, 3841 - 3848. (DOI: 10.1016/j.msea.2011.01.085)
20. Borges, M.F.; Amancio-Filho, S.T.; dos Santos, J.F.; Strohaecker, T.R.; Mezzaferro, J.A.E.: Development of computational models to predict the mechanical behavior of Friction Riveting joints. In: *Computational Materials Science*. Vol. 54 (2012) 7 - 15. (DOI: 10.1016/j.commatsci.2011.10.031)
21. Hanke, S.; Fischer, A.; Beyer, M.; dos Santos, J.: Cavitation erosion of NiAl-bronze layers generated by friction surfacing. In: *Wear* . Vol. 273 (2011) 1, 32 - 37. (DOI: 10.1016/j.wear.2011.06.002)
22. Santos, T.G.; Miranda, R.M.; Vilaca, P.; Teixeira, J.P.; dos Santos, J.: Microstructural mapping of friction stir welded AA 7075-T6 and AlMgSc alloys using electrical conductivity. In: *Science and Technology of Welding and Joining*. Vol. 16 (2011) 7, 630 - 635. (DOI: 10.1179/1362171811Y.0000000052)
23. Santos, T.G.; Vilaca, P.; Quintino, L.; dos Santos, J.F.; Miranda, R.M.: Application of eddy current techniques to inspect friction spot welds in aluminium alloy AA2024 and a composite material. In: *Welding in the world*. Vol. 55 (2011) 9-10, 2164.
24. Springer, H.; Kostka, A.; dos Santos, J.F.; Raabe, D.: Influence of intermetallic phases and Kirkendall-porosity on the mechanical properties of joints between steel and aluminium alloys . In: *Materials Science and Engineering A*. Vol. 528 (2011) 13-14, 4630 - 4642. (DOI: 10.1016/j.msea.2011.02.057)

2010

25. Abibe, A.B.; Amancio-Filho, S.T.; dos Santos, J.F.; Hage, E.jr.; : Development and Analysis of a New Joining Method for Polymer–Metal Hybrid Structures. In: *Journal of Thermoplastic Composite Materials*. Vol. 24 (2011) 2, 233 - 249. (DOI: 10.1177/0892705710381469)
26. de Oliveira, P.H.F.; Amancio-Filho, S.T.; dos Santos, J.F.; Hage, E.jr.: Preliminary study on the feasibility of friction spot welding in PMMA. In: *Materials Letters*. Vol. 64 (2010) 19, 2098 - 2101. (DOI: 10.1016/j.matlet.2010.06.050)
27. Haibel, A.; Beckmann, F.; Dose, T.; Herzen, J.; Ogurreck, M.; Mueller, M.; Schreyer, A.: Latest developments in microtomography and nanotomography at

- PETRA III. In: Powder Diffraction. Vol. 25 (2010) 2, 161 - 164. (DOI: 10.1154/1.3428364)
28. Hilgert, J.; Schmidt, H.N.B.; dos Santos, J.F.; Huber, N.: Thermal Models for Bobbin Tool Friction Stir Welding . In: Journal of Materials Processing Technology. Vol. 211 (2011) 2, 197 - 204. (DOI: 10.1016/j.jmatprotec.2010.09.006)
29. Lima, T.R.S.; Martins, C.O.D.;Reguly, A.; dos Santos, J.F.: An investigation on the application of a non-destructive optical strain measurement system to fracture toughness testing. In: Insight. Vol. 52 (2010) 5, 255 - 261.
30. Rao, D.; Heerens, J.; Pinheiro, G.; dos Santos, J.F.; Huber, N.: On characterisation of local stress–strain properties in friction stir welded aluminium AA 5083 sheets using micro-tensile specimen testing and instrumented indentation technique. In: Materials Science and Engineering A. Vol. 527 (2010) 18-19, 5018 - 5025. (DOI: 10.1016/j.msea.2010.04.047)
31. Rao, J.; Payton, E.J.; Somsen, C.; Neuking, K.; Eggeler, G.; Kostka, A.; dos Santos, J.F.: Where Does the Lithium Go? – A Study of the Precipitates in the Stir Zone of a Friction Stir Weld in a Li-containing 2xxx Series Al Alloy. In: Advanced Engineering Materials. Vol. 12 (2010) 4, 298 - 303. (DOI: 10.1002/adem.200900284)
32. Rosendo, T.S.; Parra, B.; Tier, M.A.D.; da Silva, A.A. M.; dos Santos, J.F.; Strohaecker, T.R.; Alcantara, N.G.: Mechanical and microstructural investigation of friction spot welded AA6181-T4 aluminium alloy . In: Materials and Design. Vol. 32 (2011) 3, 1094 - 1100. (DOI: 10.1016/j.matdes.2010.11.017)

2009

33. Amancio, S.; dos Santos, J.: Joining of polymers and polymer-metal hybrid structures: Recent developments and trends. In: Polymer Engineering & Science. Vol. 49 (2009) 8, 1461 - 1476. (DOI: 10.1002/pen.21424)
34. Coelho, R.S.; Kostka, A.; dos Santos, J.; Pyzalla, A.R.: EBSD Technique Visualization of Material Flow in Aluminum to Steel Friction-stir Dissimilar Welding. In: Advanced Engineering Materials. Vol. 10 (2009) 12, 1127 - 1133. (DOI: 10.1002/adem.200800227)
35. Kostka, A.; Coelho, R.S.; dos Santos, J.; Pyzalla, A.R.: Microstructure of friction stir welding of aluminium alloy to magnesium alloy. In: Scripta Materialia. Vol. 60 (2009) 11, 953 - 956. (DOI: 10.1016/j.scriptamat.2009.02.020)

36. Mazzaferro, C.C.P.; Ramos, F.D.; Mazzaferro, J.A.E.; Rosendo, T.S.; Tier, M.A.D.; da Silva, A.A.M.; dos Santos, J.F.; Reguly, A.: Microstructural Evaluation and Mechanical Properties of a Friction Stir Spot Welded TRIP 800 Steel - Avaliacao Microestrutural e Propriedades Mecanicas de um Aço TRIP Soldado a Ponto por Friccao e Mistura Mecanica. In: Soldagem & Inspecao. Vol. 14 (2009) 4, 278 - 287. (DOI: 10.1590/S0104-92242009000400002)
37. Mazzaferro, J.A.E.; Rosendo, T.; Mazzaferro, C.C.P.; Ramos, F.D.; Tier, M.A.D.; Strohaecker, T.R.; dos Santos, J.F.: Preliminary Study on the Mechanical Behavior of Friction Spot Welds - Estudo Preliminar do Comportamento Mecanico de Soldas a Ponto por Friccao. In: Soldagem & Inspecao. Vol. 14 (2009) 3, 238 - 247. (DOI: 10.1590/S0104-92242009000300007)
38. Zeng, R.-C.; Chen, J.; Dietzel, W.; Zettler, R.; dos Santos, J.F.; Nascimento, L.; Kainer, K.U.: Corrosion of Friction Stir Welded Magnesium Alloy AM50. In: Corrosion Science. Vol. 51 (2009) 8, 1738 - 1746. (DOI: 10.1016/j.corsci.2009.04.031)

Appendix Ib: List of Publications in Proceedings 2009 - 2014

2014

1. Pieta, G.; Brzostek, R.; dos Santos, J.F.; Strohaecker, T. R.; Clarke, T.: Mechanical Behaviour of Friction Spot Welded Joints in 2198-T8 Aluminium Alloy Sheets. In: 25th Advanced Aerospace Materials and Processes (AeroMat), Conference and Exposition, June 16-19, 2014, Orlando, USA.
2. Barbini, A.; Carstensen, J., Miyazaki, M., Fernandez, F.; dos Santos, J.F., Huber, N.: A Comparison Between the Deformation Behaviour of Dissimilar AA2024-T3/AA7050-T7651 Welds Produced by Stationary Shoulder Friction Stir Welding and Standard Friction Stir Welding. In: 25th Advanced Aerospace Materials and Processes (AeroMat), Conference and Exposition, June 16-19, 2014, Orlando, USA.
3. Suhuddin, U.; Kroeff, F.; Pegoraro, L.; dos Santos, J.F.: Interface Modification in Dissimilar Friction Spot Welds of Al and Mg. In: 10th International Friction Stir Welding Symposium. Beijing, China, 19.05 – 22.05.2014
4. Fu, T.; Li, W.; dos Santos, J.F.: Characterisation of BT-Friction Stir Welded Magnesium Alloy. In: 10th International Friction Stir Welding Symposium. Beijing, China, 19.05 – 22.05.2014
5. Shen, J.; Barbosa, M.; dos Santos, J.F.: A Preliminary Study on FSpW of Dissimilar Joints of Cu and Al. In: 10th International Friction Stir Welding Symposium. Beijing, China, 19.05 – 22.05.2014
6. Abibe, A.B.; dos Santos, J.M.; Amancio Filho, S.T.: Friction Staking: A Novel Staking Joining Method for Hybrid Structures. In: Society of Plastics Engineers (Hrsg.): Proceedings of the Annual Conference of the Society of Plastics Engineers, ANTEC 2014. Las Vegas, CA (USA), 28.-30.04.2014, 2014. 1775 - 1781. (ISBN: 978-0-9850112-4-6)
7. Blankenburg, M.; Staron, P.; Stark, A.; Fischer, T.; Schell, N.; Hilgert, N.; Bermann, L.; dos Santos, J.F.; Mueller, M.; Huber, N.; Schreyer, A.: In situ investigation of phase transformations in friction stir welded steels using high-energy X-ray diffraction. In: Kondensierte Materie, DPG Fruehjahrstagung 2014. Dresden (D), 30.03. - 04.04.2014.
8. Suhuddin, U.; Kroeff, F.; Pegoraro, L.; dos Santos, J.F.: Application of Friction Stir Spot Welding to Mixed Material Joints in Car Body Manufacturing. In: Joining in Car Body Engineering 2014, Bad Nauheim, Germany, 02. – 03.04.2014.

9. Huetsch, L.; Araujo Hsia, L.; dos Santos, J.F.; Huber, N.: Investigations of shear layer morphology alterations using high speed friction stir processing with varying probe geometries. In: Pan American Materials Conference 2014. Sao Paulo (BR), 21.- 25.07.2014, 2014.

2013

10. Huetsch, L.; dos Santos, J.F.; Huber, N.: Investigations of microstructural, thermal and local strain phenomena of high-speed friction stir processed Mg AZ31. In: Fujii, H. (Hrsg.): Proceedings of the 1st International Joint Symposium on Joining and Welding, IJS-JW 2013. Osaka (J), 06.-08.11.2013, 2014. 59 - 65. (DOI: 10.1533/9781782421641.59) (ISBN: 978-1-78242-163-4)
11. Abibe, A.; Sonego, M.; dos Santos, J.F.; Amancio, S.: Friction-Based Injection Clinching Joining of Plastics to Metals. In: 66th Annual Assembly of the International Institute of Welding. Essen (D), 11.-17.09.2013, 2013.
12. Amancio-Filho, S.T.; Abibe, A.; dos Santos, J.F.: Welding and joining of composites and composite-metal structures by frictional heating. In: Schulte, K. (Hrsg.): Tagungsband, Faserverbundwerkstoffe in der Energiewende, 19. Nationales Symposium SAMPE Deutschland e.V.. Vol. 18 Hamburg (D), 27.- 28.02.2013, Hamburg: TuTech Innovation, 2013. 65 - 67. (ISBN: 978-3-941492-58-5)
13. Amancio, S.; dos Santos, J.F.; Abibe, A.: Joining of Polymeric and Metal-Polymer Structures by Frictional Heating. In: Polymerwerkstoffe, Sitzung des DGM-Fachausschusses. Hamburg (D), 07.- 08.11.2013, 2013.
14. Esteves, J.; Goushegir, S.; dos Santos, J.F.; Canto, L.; Hage, E.; Amancio, S.: Friction spot joining of aluminum 6181-T4 and carbon fiber-reinforced poly(phenylene sulfide): Effects of process parameters on microstructure and strength. In: European Congress and Exhibition on Advanced Materials and Processes, EUROMAT 2013. Sevilla (E) , 08.-13.09.2013, 2013.
15. Goushegir, S.; dos Santos, J.F.; Amancio, S.: Effect of mechanical surface pre-treatment on interlocking phenomenon of AA2024-T3 / CF-PPS friction spot joints. In: 2nd International Conference on Structural Adhesive Bonding, AB 2013. Porto (P), 04.-05.07.2013, 2013.
16. Goushegir, S.; dos Santos, J.F.; Amancio, S.: Effect of mechanical surface pre-treatment on interlocking phenomenon of AA2024-T3 / CF-PPS friction spot joints.

- In: da Silva, L.F.M. 2nd International Conference on Structural Adhesive Bonding, AB 2013. Porto (P), 04.-05.07.2013, 2013. 41. (ISBN: 978-989-723-048-6)
17. Suhuddin, U.; Fischer, V.; dos Santos, J.F.: Formation of Intermetallic Compounds in Dissimilar Friction Spot Weld of Al to Mg Alloys. In: Materials Science Forum, Light Metals Technology Conference, LMT 2013. Vol. 765 (2013) 731 - 735. (DOI: 10.4028/www.scientific.net/MSF.765.731)
18. Suhuddin, U.; Fischer, V.; dos Santos, J.F.: Microstructure in Dissimilar Friction Spot Weld of Al to Mg Alloys Observed by Stop-Action Technique. In: 142nd Annual Meeting & Exhibition, TMS 2013. San Antonio, TX (USA), 03.-07.03.2013, 2013.
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2012

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Appendix Ic: List of Keynote und Invited Lectures 2009 - 2014

1. Richter-Trummer, V.; Irving, P.; Zhang, X.; Pacchione, M.; Beltrao, M. and J.F. dos Santos. Behaviour of Friction Stir Welded Joints in Al-Li Alloy Under Biaxial Fatigue Loading, International Conference on Processing & Manufacturing of Advanced Materials, THERMEC' 2013. Las Vegas, USA, 02. – 06.12.2013, 2013.
2. dos Santos, J.F.: Friction Stir Welding of Primary Structural Elements of a Medium Size Aircraft. In: 5th International Conference on Welding Science and Engineering, WSE 2013. Weihai, China, 11.10 – 14.10.2013, 2013.
3. Roos, A.; Fernandez, F.; Cruz, M.; dos Santos, J.F.: Friction Stir Welding of Primary Structural Elements of a Medium Size Aircraft. In: 5th International Conference on Welding Science and Engineering, WSE 2013. Weihai, China, 11.10 – 14.10.2013, 2013.
4. dos Santos, J.F.: Reibruehschweissen: Verfahren und Anwendungen. In: Fuegeverfahren, TechForum. Hamburg (D), 27.05.2013, 2013.
5. Gibson, D. and dos Santos, J.F.: Reibschweissen im Bereich Offshore Anwendungen. In: 20. Erfahrungsaustausch Reibschweissen. Muenchen (D), 11.-12.03.2013, 2013.
6. Suhuddin, U., Campanelli, L., Bissolatti, M.; Wang, H; Verastegui, R.; dos Santos, J.F.. In: A review on microstructural and mechanical properties of friction spot welds in Al-based similar and dissimilar joints. In: 1st International Joint Symposium on Joining and Welding, IJS-JW 2013. Osaka (J), 06.-08.11.2013, 2013.
7. dos Santos, J.F.: Historia y futuro de la tecnica Friction Stir Welding y sus variantes. In: I Jornada Iberica de Aplicacion Industrial de la Tecnica. Vigo, Spain, 01.02.2012, 2012.
8. dos Santos, J.F.: Solid State Joining Processes / WMP Research on FSW and Related Processes at HZG. In: Vortrag an der Northwestern Polytechnical University. Xian (VRC), 20.05.2012, 2012.
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10. dos Santos, J.F.: Reibruehrschweissen und Reibpunktschweissen von Al-Legierungen im Fahrzeug- und Flugzeugbau. In: GDA-Seminar: Fuegen von Aluminiumprofilen und -blechen. Duisburg (D), 02.02.2011, 2011.
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12. dos Santos, J.F.; Roos, A.; Fritz, J.; Hilgert, J.; Dethlefs, A.; Pieta, G.: Ruehrreibschweissen und Hybridverfahren. In: Innovationsforum Sensitive Fertigungstechnik. Magdeburg (D), 10.-11.11.2011, 2011.
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Appendix II: List of Patents

Short Description	Title	Patent Number	Country	Registered on	Granted on	Inventors
Vorrichtung zum Verbinden von Werkstücken nach der Methode des Reibrührschweißens	Vorrichtung zum Verbinden von Werkstücken nach der Methode des Reibrührschweißens	EP000000012300 63B1	DE	16.11.2000	12.07.2006	v. Strombeck Alexander, dos Santos Jorge F.
	Vorrichtung zum Verbinden von Werkstücken nach der Methode des Reibrührschweißens	DE000000199571 36C1	DE	18.11.1999	08.02.2001	
	Vorrichtung zum Verbinden von Werkstücken nach der Methode des Reibrührschweißens	EP000000012300 63B1	GB	16.11.2000	12.07.2006	
	Vorrichtung zum Verbinden von Werkstücken nach der Methode des Reibrührschweißens	EP000000012300 63B1	SE	16.11.2000	12.07.2006	
	Vorrichtung zum Verbinden von Werkstücken nach der Methode des Reibrührschweißens	US000000067997 08B2	US	16.05.2002	05.10.2004	
FSpW (Reibpunktschweißen)	Verfahren und Vorrichtung zum Verbinden von wenigstens zweieinanderliegenden Werkstücken nach der Methode des	EP000000012300 62B1	DE	17.11.2000	17.05.2006	Schilling Christoph, dos Santos Jorge F.
	Vorrichtung zum Verbinden von wenigstens zwei aneinanderliegenden Werkstücken nach der Methode des Reibschweißens	EP000000016906 28B1	DE	17.11.2000	27.08.2008	
	Vorrichtung zum Verbinden von wenigstens zwei aneinanderliegenden Werkstücken nach der Methode des Reibschweißens	EP000000016906 28B1	FR	17.11.2000	27.08.2008	

Short Description	Title	Patent Number	Country	Registered on	Granted on	Inventors
	Verfahren und Vorrichtung zum Verbinden von wenigstens zweieinanderliegenden Werkstücken nach der Methode des	EP000000012300 62B1	FR	17.11.2000	17.05.2006	
	Verfahren und Vorrichtung zum Verbinden von wenigstens zweieinanderliegenden Werkstücken nach der Methode des	EP000000012300 62B1	GB	17.11.2000	17.05.2006	
	Vorrichtung zum Verbinden von wenigstens zwei aneinanderliegenden Werkstücken nach der Methode des Reibschweißens	EP000000016906 28B1	GB	17.11.2000	27.08.2008	
	Vorrichtung zum Verbinden von wenigstens zwei aneinanderliegenden Werkstücken nach der Methode des Reibschweißens	EP000000016906 28B1	IT	17.11.2000	27.08.2008	
	Verfahren und Vorrichtung zum Verbinden von wenigstens zweieinanderliegenden Werkstücken nach der Methode des	EP000000012300 62B1	IT	17.11.2000	17.05.2006	
	Method and device for joining at least two adjoining work pieces by friction welding	US000000067225 56B2	US	17.11.2000	20.04.2004	
Einrichtung zum Verbinden von wenigstens zwei wenigstens im	Einrichtung zum Verbinden von wenigstens zwei wenigstens im Verbindungsbereich aneinanderliegenden Werkstücken nach	EP000000012300 64B1	DE	17.11.2000	07.04.2010	Schilling Christoph, dos Santos Jorge F.

Short Description	Title	Patent Number	Country	Registered on	Granted on	Inventors
Verbindungsbereich aneinanderliegenden Werkstücken nach der Methode des Reibrührschweißens	der Methode des Reibrührschweißens					
	Einrichtung zum Verbinden von wenigstens zwei wenigstens imVerbindungsbereich aneinanderliegenden Werkstücken nach der Methode des Reibrührschweißens	DE0000000199569 63B4	DE	18.11.1999	29.12.2005	
	Einrichtung zum Verbinden von wenigstens zwei wenigstens imVerbindungsbereich aneinanderliegenden Werkstücken nach der Methode des Reibrührschweißens	EP0000000012300 64B1	FR	17.11.2000	07.04.2010	
	Einrichtung zum Verbinden von wenigstens zwei wenigstens imVerbindungsbereich aneinanderliegenden Werkstücken nach der Methode des Reibrührschweißens	EP0000000012300 64B1	GB	17.11.2000	07.04.2010	
	Einrichtung zum Verbinden von wenigstens zwei wenigstens im Verbindungsbereich aneinanderliegenden Werkstücken n. der Methode des Reibrührschweißens	EP0000000012300 64B1	IT	17.11.2000	07.04.2010	
	Einrichtung zum Verbinden von wenigstens zwei wenigstens im Verbindungsbereich aneinanderliegenden Werkstücken nach der Methode des Reibrührschweißens	EP0000000012300 64B1	SE	17.11.2000	07.04.2010	
	Device for joining, by friction stir welding,at least two workpices	US0000000066046 67B2	US	16.05.2002	12.08.2003	

Short Description	Title	Patent Number	Country	Registered on	Granted on	Inventors
Connecting conduits for fluids	Connecting conduits for fluids	BR00000000115167B1	BR	08.11.2001	16.11.2011	Vennemann Olav, Meyer Axel, dos Santos Jorge
	Connecting conduits for fluids	GB00000002384840B	GB	08.11.2001	28.07.2004	
	Connecting conduits for fluids	NO00000000331716B1	NO	29.04.2003	05.03.2012	
	Connecting conduits for fluids	US00000007588178B2	US	08.11.2001	15.09.2009	
Verfahren und Vorrichtung zum Verbinden von wenigstens zweieinanderliegenden Werkstücken nach der Methode des Reibrührschießens	Verfahren und Vorrichtung zum Verbinden von wenigstens zweieinanderliegenden Werkstücken nach der Methode des Reibrührschießens	EP00000001442820B1	CZ	31.12.2003	22.10.2008	Schilling Christoph, v. Strombeck Alexander, dos Santos Jorge F.
	Verfahren und Vorrichtung zum Verbinden von wenigstens zweieinanderliegenden Werkstücken nach der Methode des Reibrührschießens	EP00000001442820B1	DE	31.12.2003	22.10.2008	
	Verfahren und Vorrichtung zum Verbinden von wenigstens zweieinanderliegenden Werkstücken nach der Methode des Reibrührschießens	EP00000001442820B1	FR	31.12.2003	22.10.2008	
	Verfahren und Vorrichtung zum Verbinden von wenigstens zweieinanderliegenden Werkstücken nach der Methode des Reibrührschießens	EP00000001442820B1	GB	31.12.2003	22.10.2008	
	Verfahren und Vorrichtung zum Verbinden von wenigstens zweieinanderliegenden Werkstücken nach der Methode des Reibrührschießens	EP00000001442820B1	IT	31.12.2003	22.10.2008	

Short Description	Title	Patent Number	Country	Registered on	Granted on	Inventors
	zweieinanderliegenden Werkstücken nach der Methode des Reibrührschißens					
Herstellen von Schweißverbindungen zwischen Metallbändern,-platten, -barren und/oder -profilen	Herstellen von Schweißverbindungen zwischen Metallbändern,-platten, -barren und/oder -profilen	DE00000010049058B4	DE	04.10.2000	28.07.2005	Brungs Dieter, Mertz Andreas, dos Santos Jorge F., Schilling Christoph, v. Strombeck Alexande
Vorrichtung zum Verbinden von Werkstücken nach der Methode des Reibrührschißens	Vorrichtung zum Verbinden von Werkstücken nach der Methode des Reibrührschißens	DE00102004028553B3	DE	15.06.2004	03.11.2005	Loitz Henry, Wulfsberg Jens, von der Wense Jens, v. Strombeck Alexander, Schilling Christoph, dos Santos Jorge F.
Vorrichtung zum Verbinden von Werkstücken nach der Methode des Reibrührschißens	Vorrichtung zum Verbinden von Werkstücken nach der Methode des Reibrührschißens	EP00000001607165B1	AT	13.06.2005	22.10.2008	Loitz Henry, Wulfsberg Jens, von der Wense Jens, v. Strombeck Alexander, Schilling Christoph, dos Santos Jorge F.
	Vorrichtung zum Verbinden von Werkstücken nach der Methode des Reibrührschißens	2509761	CA	13.06.2005	22.01.2013	
	Vorrichtung zum Verbinden von Werkstücken nach der Methode des Reibrührschißens	EP00000001607165B1	DE	13.06.2005	22.10.2008	
	Vorrichtung zum Verbinden von	ÊP000000016071	ES	13.06.2005	22.10.2008	

Short Description	Title	Patent Number	Country	Registered on	Granted on	Inventors
	Werkstücken nach der Methode des Reibrührschweißens	65B1				
	Vorrichtung zum Verbinden von Werkstücken nach der Methode des Reibrührschweißens	EP000000016071 65B1	FR	13.06.2005	22.10.2008	
	Vorrichtung zum Verbinden von Werkstücken nach der Methode des Reibrührschweißens	EP000000016071 65B1	GB	13.06.2005	22.10.2008	
	Vorrichtung zum Verbinden von Werkstücken nach der Methode des Reibrührschweißens	EP000000016071 65B1	IT	13.06.2005	22.10.2008	
	Vorrichtung zum Verbinden von Werkstücken nach der Methode des Reibrührschweißens	JP0000000452644 4B2	JP	14.06.2005	11.06.2010	
	Vorrichtung zum Verbinden von Werkstücken nach der Methode des Reibrührschweißens	EP000000016071 65B1	SE	13.06.2005	22.10.2008	
	Vorrichtung zum Verbinden von Werkstücken nach der Methode des Reibrührschweißens	US000000072346 25B2	US	15.06.2005	26.06.2007	
Vorrichtung zum Reibrührschweißen	Vorrichtung zum Reibrührschweißen	EP000000017388 56B1	DE	22.05.2006	31.03.2010	Zettler Rudolph, Sheikhi Shahram, Beyer Matthias, dos Santos Jorge F., Roos Arne, Loitz Henry
	Vorrichtung zum Reibrührschweißen	EP000000017388 56B1	FR	22.05.2006	31.03.2010	
	Vorrichtung zum Reibrührschweißen	EP000000017388 56B1	GB	22.05.2006	31.03.2010	
	Vorrichtung zum Reibrührschweißen	JP0000000506942 8B	JP	27.06.2006	24.08.2012	

Short Description	Title	Patent Number	Country	Registered on	Granted on	Inventors
	Vorrichtung zum Reibrührschweißen	EP00000001738856B1	SE	22.05.2006	31.03.2010	
Verfahren und Vorrichtung zum Herstellen einer Schweißverbindung zwischen den Oberflächen zweier flächiger Werkstücke	Verfahren und Vorrichtung zum Herstellen einer Schweißverbindung zwischen den Oberflächen zweier flächiger Werkstücke	EP00000001769877B1	DE	25.09.2006	02.06.2010	dos Santos Jorge F., Roos Arne
	Verfahren und Vorrichtung zum Herstellen einer Schweißverbindung zwischen den Oberflächen zweier flächiger Werkstücke	EP00000001769877B1	ES	25.09.2006	02.06.2010	
	Verfahren und Vorrichtung zum Herstellen einer Schweißverbindung zwischen den Oberflächen zweier flächiger Werkstücke	EP00000001769877B1	FR	25.09.2006	02.06.2010	
	Verfahren und Vorrichtung zum Herstellen einer Schweißverbindung zwischen den Oberflächen zweier flächiger Werkstücke	EP00000001769877B1	GB	25.09.2006	02.06.2010	
	Verfahren und Vorrichtung zum Herstellen einer Schweißverbindung zwischen den Oberflächen zweier flächiger Werkstücke	EP00000001769877B1	IT	25.09.2006	02.06.2010	
	Verfahren und Vorrichtung zum Herstellen einer Schweißverbindung zwischen den Oberflächen zweier flächiger Werkstücke	EP00000001769877B1	SE	25.09.2006	02.06.2010	

Short Description	Title	Patent Number	Country	Registered on	Granted on	Inventors
	Herstellen einer Schweißverbindung zwischen den Oberflächen zweier flächiger Werkstücke	77B1				
	Verfahren und Vorrichtung zum Herstellen einer Schweißverbindung zwischen den Oberflächen zweier flächiger Werkstücke	US000000078829 98B2	US	26.09.2006	08.02.2011	
FricRiveting	Process for joining a metallic bolt to a plastic workpiece		CA	16.11.2006	/ /	Amancio Sergio, Beyer Matthias, dos Santos Jorge F.
	Verfahren zum Verbinden eines metallischen Bolzens mit einem Kunststoff-Werkstück	EP000000017904 62B1	DE	24.11.2006	23.02.2011	
	Verfahren zum Verbinden eines metallischen Bolzens mit einem Kunststoff-Werkstück	EP000000017904 62B1	ES	24.11.2006	23.02.2011	
	Procédé pour connecter un boulon à une pièce en matière plastique	EP000000017904 62B1	FR	24.11.2006	23.02.2011	
	Process for joining a metallic bolt to a plastic workpiece	EP000000017904 62B1	GB	24.11.2006	23.02.2011	
	Verfahren zum Verbinden eines metallischen Bolzens mit einem Kunststoff-Werkstück	EP000000017904 62B1	IT	24.11.2006	23.02.2011	
	Verfahren zum Verbinden eines metallischen Bolzens mit einem Kunststoff-Werkstück	5276265	JP	28.11.2006	24.05.2013	
	Verfahren zum Verbinden eines	EP000000017904	PT	24.11.2006	23.02.2011	

Short Description	Title	Patent Number	Country	Registered on	Granted on	Inventors
	metallischen Bolzens mit einem Kunststoff-Werkstück	62B1				
	Verfahren zum Verbinden eines metallischen Bolzens mit einem Kunststoff-Werkstück	EP000000017904 62B1	SE	24.11.2006	23.02.2011	
	Method of connecting a metallic bolt to a plastic workpiece	US000000075751 49B2	US	20.11.2006	18.08.2009	
ICJ - Injection Clinching Joining	Verfahren und Vorrichtung zum Verbinden einesKunststoff-Werkstücks mit einem weiteren Werkstück		CA	29.11.2006	/ /	Amancio Sergio, dos Santos Jorge F., Beyer Matthias
	Verfahren und Vorrichtung zum Verbinden einesKunststoff-Werkstücks mit einem weiteren Werkstück	5,02006E+12	DE	24.11.2006	24.07.2013	
	Verfahren und Vorrichtung zum Verbinden einesKunststoff-Werkstücks mit einem weiteren Werkstück	DE001020050578 91B4	DE	02.12.2005	18.10.2007	
	Verfahren und Vorrichtung zum Verbinden einesKunststoff-Werkstücks mit einem weiteren Werkstück	1792707	ES	24.11.2006	24.07.2013	
	Verfahren und Vorrichtung zum Verbinden einesKunststoff-Werkstücks mit einem weiteren Werkstück	1792707	FR	24.11.2006	24.07.2013	
	Verfahren und Vorrichtung zum Verbinden einesKunststoff-Werkstücks mit einem weiteren Werkstück	1792707	GB	24.11.2006	24.07.2013	
	Verfahren und Vorrichtung zum Verbinden einesKunststoff-Werkstücks mit einem weiteren Werkstück	1792707	IT	24.11.2006	24.07.2013	

Short Description	Title	Patent Number	Country	Registered on	Granted on	Inventors
	Verfahren und Vorrichtung zum Verbinden eines Kunststoff-Werkstücks mit einem weiteren Werkstück	JP0000000512947 6B	JP	01.12.2006	09.11.2012	
	Verfahren und Vorrichtung zum Verbinden eines Kunststoff-Werkstücks mit einem weiteren Werkstück	1792707	PT	24.11.2006	24.07.2013	
	Verfahren und Vorrichtung zum Verbinden eines Kunststoff-Werkstücks mit einem weiteren Werkstück	1792707	SE	24.11.2006	24.07.2013	
	Method and device for connecting a plastic workpiece to a further workpiece	US000000077804 32B2	US	01.12.2006	24.08.2010	
	Verfahren und Vorrichtung zum Verbinden eines Kunststoff-Werkstücks mit einem weiteren Werkstück	US000000080258 27B2	US	01.12.2006	27.09.2011	
Rückwirkungsarmer Reibrührschweißkopf zum Herstellen von flanschartigen Überlappverbindungen	Rückwirkungsarmer Reibrührschweißkopf zum Herstellen von flanschartigen Überlappverbindungen		CA	26.09.2006	/ /	Loitz Henry, Sheikhi Shahram, Wulfsberg Jens, dos Santos Jorge F.
	Rückwirkungsarmer Reibrührschweißkopf zum Herstellen von flanschartigen Überlappverbindungen		DE	11.10.2005	/ /	
	Rückwirkungsarmer Reibrührschweißkopf zum Herstellen von flanschartigen Überlappverbindungen		EP	10.10.2006	/ /	
	Rückwirkungsarmer Reibrührschweißkopf zum Herstellen	US000000076075 58B2	US	11.10.2006	27.10.2009	

Short Description	Title	Patent Number	Country	Registered on	Granted on	Inventors
	von flanschartigen Überlappverbindungen					
Verfahren zum Verbinden von Rohrboden und Rohren im Rohrbündel-Wärmeübertrager	Verfahren zum Verbinden von Rohrboden und Rohren im Rohrbündel-Wärmeübertrager		BR	19.12.2008	/ /	Roos Arne, dos Santos Jorge F., Wimmer Georg
	Verfahren zum Verbinden von Rohrboden und Rohren im Rohrbündel-Wärmeübertrager		CN	19.12.2008	/ /	
	Verfahren zum Verbinden von Rohrboden und Rohren sowie Reibwerkzeug zur Durchführung des Verfahrens	5,02008E+12	DE	16.12.2008	05.06.2013	
	Verfahren zum Verbinden von Rohrboden und Rohren im Rohrbündel-Wärmeübertrager		DE	21.12.2007	/ /	
	Verfahren zum Verbinden von Rohrboden und Rohren sowie Reibwerkzeug zur Durchführung des Verfahrens	2072173	ES	16.12.2008	05.06.2013	
	Verfahren zum Verbinden von Rohrboden und Rohren sowie Reibwerkzeug zur Durchführung des Verfahrens	2072173	FR	16.12.2008	05.06.2013	
	Verfahren zum Verbinden von Rohrboden und Rohren sowie Reibwerkzeug zur Durchführung des Verfahrens	2072173	GB	16.12.2008	05.06.2013	
	Verfahren zum Verbinden von		IN	19.12.2008	/ /	

Short Description	Title	Patent Number	Country	Registered on	Granted on	Inventors
	Rohrboden und Rohren imRohrbündel-Wärmeübertrager					
	Verfahren zum Verbinden von Rohrboden und Rohren sowie Reibwerkzeug zur Durchführung des Verfahrens	2072173	IT	16.12.2008	05.06.2013	
	Verfahren zum Verbinden von Rohrboden und Rohren imRohrbündel-Wärmeübertrager	5227154	JP	19.12.2008	22.03.2013	
	Verfahren zum Verbinden von Rohrboden und Rohren sowie Reibwerkzeug zur Durchführung des Verfahrens	2072173	PT	16.12.2008	05.06.2013	
	Verfahren zum Verbinden von Rohrboden und Rohren imRohrbündel-Wärmeübertrager	RU000000024884 70C2	RU	19.12.2008	27.07.2013	
	Verfahren zum Verbinden von Rohrboden und Rohren sowie Reibwerkzeug zur Durchführung des Verfahrens	2072173	SE	16.12.2008	05.06.2013	
	Verfahren zum Verbinden von Rohrboden und Rohren imRohrbündel-Wärmeübertrager	US000000079546 91B2	US	22.12.2008	07.06.2011	
Friction Spot Joining	Verfahren und Vorrichtung zum Verbinden von Kunststoff- und Metallteilen	EP000000023299 05B1	DE	03.12.2009	30.05.2012	Amancio Sergio, dos Santos Jorge F.
	Verfahren und Vorrichtung zum Verbinden von Kunststoff-	EP000000023299 05B1	ES	03.12.2009	30.05.2012	

Short Description	Title	Patent Number	Country	Registered on	Granted on	Inventors
	undMetallteilen					
	Procédé pour assembler des pièces métalliques et plastiques	EP000000023299 05B1	FR	03.12.2009	30.05.2012	
	Method for joining metal and plastic workpieces	EP000000023299 05B1	GB	03.12.2009	30.05.2012	
	Verfahren und Vorrichtung zum Verbinden von Kunststoff- undMetallteilen	EP000000023299 05B1	IT	03.12.2009	30.05.2012	
	Method for joining metal and plastic workpieces		JP	02.12.2010	/ /	
	Method for joining metal and plastic workpieces	8567032	US	03.12.2010	29.10.2013	
MIMStruct - Metal Injection Structuring Molding	Verfahren zur Herstellung von Metallformkörpern mitstrukturierter Oberfläche		CA	16.12.2011	/ /	Milagres Ferri Orley, Ebel Thomas, Amancio Sergio, dos Santos Jorge F.
	Verfahren zur Herstellung von Metallformkörpern mitstrukturierter Oberfläche	5020100028420	DE	16.12.2010	03.04.2013	
	Verfahren zur Herstellung von Metallformkörpern mitstrukturierter Oberfläche	2468436	ES	16.12.2010	03.04.2013	
	Verfahren zur Herstellung von Metallformkörpern mitstrukturierter Oberfläche	2468436	FR	16.12.2010	03.04.2013	
	Verfahren zur Herstellung von Metallformkörpern mitstrukturierter Oberfläche	2468436	GB	16.12.2010	03.04.2013	
	Verfahren zur Herstellung von	2468436	IT	16.12.2010	03.04.2013	

Short Description	Title	Patent Number	Country	Registered on	Granted on	Inventors
	Metallformkörpern mitstrukturierter Oberfläche					
	Verfahren zur Herstellung von Metallformkörpern mitstrukturierter Oberfläche		JP	06.12.2011	/ /	
	Verfahren zur Herstellung von Metallformkörpern mitstrukturierter Oberfläche	2468436	PT	16.12.2010	03.04.2013	
	Process for Producing Shaped Metal Bodies Having a Structured Surface		US	15.12.2011	/ /	
Vorrichtung zum Reibrührschweißen	Werkzeug zum Reibrührschweißen in Bobbin Konfiguration mitstehenden Schultern		BR	02.04.2012	/ /	Hilgert Jakob, dos Santos Jorge F.
	Werkzeug zum Reibrührschweißen in Bobbin Konfiguration mitstehenden Schultern		CA	30.03.2012	/ /	
	Werkzeug zum Reibrührschweißen in Bobbin Konfiguration mitstehenden Schultern		CN	01.04.2012	/ /	
	Werkzeug zum Reibrührschweißen in Bobbin Konfiguration mitstehenden Schultern	DE001020110158 31B3	DE	01.04.2011	26.07.2012	
	Werkzeug zum Reibrührschweißen in Bobbin Konfiguration mitstehenden Schultern		EP	19.03.2012	/ /	
	Werkzeug zum Reibrührschweißen in Bobbin Konfiguration mitstehenden Schultern		US	02.04.2012	/ /	

Short Description	Title	Patent Number	Country	Registered on	Granted on	Inventors
	Schultern					
Selbstspannendes Reibschweißwerkzeug	Selbstspannendes Reibschweißwerkzeug		BR	23.11.2012	/ /	Roos Arne, Fritz Jan, Bergmann Luciano, dos Santos Jorge F.
	Selbstspannendes Reibschweißwerkzeug		CA	22.11.2012	/ /	
	Selbstspannendes Reibschweißwerkzeug		CN	23.11.2012	/ /	
	Selbstspannendes Reibschweißwerkzeug		EP	25.11.2011	/ /	
	Selbstspannendes Reibschweißwerkzeug		JP	21.11.2012	/ /	
	Selbstspannendes Reibschweißwerkzeug		US	21.11.2012	/ /	
Friction Staking	Verfahren zum Verbinden eines Kunststoffwerkstücks mit einem weiteren Werkstück		BR	25.10.2012	/ /	Amancio Sergio, dos Santos Jorge F., Bastos Abibe Andre
	Verfahren zum Verbinden eines Kunststoffwerkstücks mit einem weiteren Werkstück		CA	24.10.2012	/ /	
	Verfahren zum Verbinden eines Kunststoffwerkstücks mit einem weiteren Werkstück		CN	25.10.2012	/ /	
	Verfahren zum Verbinden eines Kunststoffwerkstücks mit einem weiteren Werkstück		EP	25.10.2011	/ /	
	Verfahren zum Verbinden eines Kunststoffwerkstücks mit einem weiteren Werkstück		JP	24.10.2012	/ /	
	Verfahren zum Verbinden eines Kunststoffwerkstücks mit einem weiteren Werkstück	8518198	US	24.10.2012	27.08.2013	

Appendix III: Projects listed according to the funding modality

HZG Core Research Programme

1986 to 1989	<i>Title:</i>	Robotic Underwater Dry Welding for Operation in the Pressure Range 50 to 110 bar (500m to 1100m depth) (<u>HZG Core Research Programme</u>)
1990 to 1993	<i>Title:</i>	Hyperbaric GMA Welding of Duplex Stainless Steels in the Pressure Range 1 to 31 bar (down to 300m depth) (<u>HZG Core Research Programme</u>)
1991 to 1993	<i>Title:</i>	Development of a Modular Orbital Welding System (MOSS) for Pipeline Repair and Installation Underwater (<u>HZG Core Research Programme</u>)
1993 to 1995	<i>Title:</i>	Microstructural and Mechanical Properties of Hyperbaric GMA Ferritic Weld Metals Deposited in the Pressure Range from 51 to 110bar. (<u>HZG Core Research Programme</u>)
1995 to 2002	<i>Title:</i>	Thematic Area “Advanced Joining Technologies for Light Weight Structures” (<u>HZG Core Research Programme</u>)
2002 to 2005	<i>Title:</i>	Topic 2 “Integrity and Joining of Advanced Light-Weight Structures” (<u>HZG Core Research Programme</u>)
2005 to date	<i>Title:</i>	Advancing Engineering Materials (AEM): 2005 – 2009: Topic 2 “Multi-Material System” 2010 – 2014: Topic 2 “Mechanics and Joining” 2014 – 2019: Topic 2 “Hybrid and Functionalised Structures”

(HZG Core Research Programme)

European Projects

- | | | |
|--------------|---------------|---|
| 1993 to 1995 | <i>Title:</i> | YAG Laser Material Processing for In-Situ Industrial Maintenance in Hostile and Confined Environment
(European Project: Brite-Euram Project BE5558) |
| | | <i>Task Leader</i> |
| 1995 to 1998 | <i>Title:</i> | Titanium Risers for Deepwater Developments
(European Project: THERMIE-Joule Project OG/175/95) |
| | | <i>Task Leader</i> |
| 1996 to 1999 | <i>Title:</i> | Assessment of Quality of Power Beam Weld Joints – "ASPOW" (European Project: Brite-Euram Project BRPR-CT95-0021) |
| | | <i>Task Leader</i> |
| 1997 to 2000 | <i>Title:</i> | Affordable Underwater Robotic Welding System – "ROBHAZ" (European Project: Brite-Euram Project BE96-3692) |
| | | <i>Task Leader</i> |
| 1998 to 2001 | <i>Title:</i> | <u>Laser Welding of Steel Linepipes</u> – "LAWLIP"
(European Project: Brite-Euram Project BE97-4667) |
| | | <i>Task Leader</i> |
| 1998 to 2001 | <i>Title:</i> | Friction Stitch Welding Repair of Pipelines – "STITCH-PIPE" (European Project: THERMIE-Joule Project OG/186/98) |
| | | <i>Task Leader</i> |
| 2001 to 2003 | <i>Title:</i> | Friction Surfacing for Multi-Sectorial Applications – |

"FRICSURF " (European Project: CRAFT-1999-70658)

Task Leader

2001 to 2003

Title: **Development of a Novel Non-Destructive Testing Techniques and Integrated Online Process Control for Robotic and Flexible FSW systems – "QUALISTIR "**
(European Project: G4ST-CT-2001-50017)

Task Leader

2000 to 2003

Title: **Development of Advanced Joining Technologies for Supermartensitic Stainless Steel Linepipes – "JOTSUP" (European Project: GROWTH Project GRD1-1999-10278)**

Task Leader

2003 to 2006

Title: **Improving Competitiveness of European Steel Fabrication Industry Using Synchronised Tandem Wire Welding Technology – "SYNFAB"** (European Project: Research Programme of the Research Fund for Coal and Steel, RFS-CR-03049)

Task Leader

2000 to 2003

Title: **Welding of Airframes using Friction Stir – "WAFS"**
(European Project: GROWTH Project GRD1-1999-10271)

Task Leader

2003 to 2005

Title: **Development of an Interactive Process Technology Database and Design Guidelines for Friction Stir Welding of Lightweight Materials – "DIPLOMAT"**
(European Project: -G1ST-CT-2002-50279 / Craft Programme)

Scientific Coordinator

2004 to 2007

Title: **Solving Welding Problems By The Use Of Friction Stir –**

"SOLVSTIR" (European Project: RFS-PR-03-077 /
Research Fund for Steel and Coal)
Coordinator

2006 to 2010 **Title:** **Cost Effective Integral Metallic Structure – “COINS”**
(European Project: AST5-CT-030825)
Task Leader

2012 to 2015 **Title:** **Strengthen International Research Collaborations on
the Development of Functional Surfaces between the
EU, Brazil and Mexico – “FUNCTIONAL”** (Marie Curie
Actions “People”: 295254)
Task Leader

Long Term (≥ 2 Years) Industrial Research Projects

1997 to 2001 **Title:** **Marinisation of an Advanced Robot for Subsea
Handling and Sampling Tasks – "MARHTA"**. Research
Programme conducted under the Technological
Cooperation Agreement between Petrobras S.A., Brazil and
HZG.

2002 to 2005 **Title:** **Effect of Material Flow Pattern on the Properties of
Friction Stir Welds in Al Alloys for Aircraft Structures
(EMFASIS)**. Research Contract conducted for AIRBUS,
Bremen, Germany.

2002 to 2005 **Title:** **Evaluation of the Friction Stir Welding Process for
Application in Medium Sized Commercial Aircraft.**
Research Contract conducted for EMBRAER, Brazil.

2004 to 2007 **Title:** **Weiterentwicklung des FSW Verfahrens für die
Anwendung in Flugzeugstrukturen (IMER)**. Research

		Contract conducted for AIRBUS, Bremen, Germany.
2006 to 2008	<i>Title:</i>	Friction Stir Welding Robotic End Effector. Research Contract conducted for The Boeing Company, Seattle, USA.
2007 to 2010	<i>Title:</i>	Stir Welded Blanks for Innovative Integral Aircraft Structures (SIRIUS). Research Contract conducted for AIRBUS, Bremen, Germany.
2007 to 2010	<i>Title:</i>	Innovative Fertigungsmethoden für integrale Leichtbaustrukturen aus neuen Werkstoffen mit unterschiedlichen Eigenspannungszuständen (IMAGINE). Research Contract conducted for Witte Gerätebau GmbH, Barskamp, Germany.
2008 to 2010	<i>Title:</i>	Metal Friction Surface Welding. Research Contract conducted for Ford Research Centre, Aachen, Germany)
2009 to 2011	<i>Title:</i>	Friction Stir Welding of Pipeline Steel (Research Contract conducted for SNAM Rete Gas, Italien)
2009 to 2011	<i>Title:</i>	Study on the Application of Friction Surfacing on Valve and Valve Seat. Research Contract conducted for Wärtsilä Corporation, Helsinki, Finland.
2010 to 2012	<i>Title:</i>	Friction Stir Welding Procedure Catalogue. Research Contract conducted for EMBRAER, São José dos Campos, Brazil)
2010 to 2014	<i>Title:</i>	Friction Stir Welding of new Integral Aircraft Structures. Research Contract conducted for EMBRAER, São José dos Campos, Brazil.

2011 to 2014	<i>Title:</i>	Friction Stir Welding of Shipbuilding Steels. Research Contract conducted for Petrobras S.A., Rio de Janeiro, Brazil.
2011 to 2013	<i>Title:</i>	Advanced and Innovative Repair Technologies (AIRtech). Research Contract conducted for Lufthansa Technik, Hamburg, Germany.
2011 to 2014	<i>Title:</i>	Entwicklung, Fertigung und Erprobung einer kraftautarken Robotik FSW-Einheit mit Stationärer Schulter für die Anwendung in Fahrzeugstrukturen (KESS). Research Contract conducted for Mercedes Benz, Untertürkheim, Germany.
2012 to 2015	<i>Title:</i>	Industrialisierung zukünftiger Prozesse im Flugzeugbau (INPRO). Research Contract conducted for Premium Aerotec, Varel, Germany, as part of the LUFO III Programme.
2012 to 2014	<i>Title:</i>	New Assembly Concepts and Technology for Metallic Structures of Next Generation Fuselage. Research Contract conducted for RUAG, Gilching, Germany.
2014 to 2016	<i>Title:</i>	Friction Stir Welding for Thick Plates of Different Aluminium Alloys for Wing Applications. Research Contract conducted for EMBRAER, São José dos Campos, Brazil)

Research Projects with Universities

2000 to 2002	<i>Title:</i>	Quality Improvement of Robotic FSW Joints ("Verbesserung der Qualität robotergeschweißter FSW-
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Verbindungen durch Erhöhung der Genauigkeit des eingesetzten Roboter mit Hilfe von Kalibrierung und Sensorikeinbindung"). Project developed within the scope of the HZG's University-Programme with the Helmut Schmidt University, Hamburg.

2007 to 2011

Title: **Improving Performance and Productivity of Integral Structures through Fundamental Understanding of Metallurgical Reactions in Metallic Joints – Virtual Institute (VI-IPSUS)** (A Programme funded by the Helmholtz Association)

Coordinator

2011 to 2014

Title: **Friction Stir Welding of Austenitic and Ferritic Stainless Steels in Similar and Dissimilar Configurations (Universo)**. A project conducted in cooperation with the Federal University Ceara, Brazil, funded by the Brazilian Council for Research and Development (CNPq), Brazil, within the scope of the International Cooperation Programme.

Institutionally Funded Projects

2009 to 2012

Title: **Prozesseffizienter metallischer Rumpf (Process Optimization for Metallic Fuselage – PROMET)** (A Programme funded by the German Ministry of Industry and Commerce (BMWi), as part of the LuFo IV Research Initiative)

2009 to 2012

Title: **Prozessgestaltung für das Rührreibschweißen großflächiger Stahlstrukturen "FSW Steel"** (A Programme funded by the German Ministry of Industry and Commerce (BMWi), as part of the AiF/ZIM Research

Initiative)

2010 to 2012

Title:

Rührreibgeschweißte Leichtbaustrukturen für Schiffsaufbauten – “FSW-Ship”. A Programme funded by the German Ministry of Industry and Commerce (BMWi).

2006 to 2009

Title:

Friction Spot welding and Friction Stir Spot Welding of Lightweight Alloys. A Project funded by the “Programm des Projektbezogenen Personalaustauschs (PPP) mit Brasilien” (DAAD/PROBRAL).

2013 to 2015

Title:

Entwicklung des Reibauftragsschweiß-Verfahrens für die Anwendung in der Öl & Gas Industrie. A Project funded by the “Programm des Projektbezogenen Personalaustauschs (PPP) mit Brasilien” (DAAD/PROBRAL).

2013 to 2017

Title:

Fatigue Behaviour and Fabrication of Oil&Gas Gathering (Riser) Systems. A Programme funded by the Brazilian Ministry of Education and Research as part of the Programme “Science without Borders”.