

# Building an International Research Network on Microjoining and Nanojoining

by Prof. Norman Zhou (March 2022)

“If you want to go fast, go alone; if you want to go far, go together. --- African proverb”

## “Microjoining and Nanojoining”

In **2005**, Norman Zhou accepted an invitation from Woodhead Publishing Ltd. (Maney Publishing Ltd, UK and CRC Press, USA) on behalf of the Institute of Materials, Minerals & Mining, UK to edit a book on Microjoining and Nanojoining as part of the book series on Materials Science and Engineering.

This book was published in **2008**, including 26 chapters, over 800 pages and 40 authors from Asia, Europe and North America, such as Profs. Akio Hirose and Kojiro Kabayashi from Osaka University, Prof. Guisheng Zou from Tsinghua University, Prof. Jae Pil Jung from the University of Seoul, Profs. Mustafa Yavuz from the University of Waterloo, Prof. Yanhong Tian from Harbin Institute of Technology and Prof. Shinji Fukumoto from the University of Hyogo.



Because of the book Prof. Teresa Vieira, Research Chair in Nanomaterials and Microfabrication, University of Coimbra, Portugal invited Norman in **2010** for a presentation at the workshop “*Microjoining by Nanostructured Materials*”. In the workshop, Norman met Prof. Luisa Quintino from Technical University of Lisbon who was then the Chief Executive Officer of the European Welding Federation and Vice-President of International Institute of Welding (IIW) among others.

## Conference Sessions and Workshops on Microjoining and Nanojoining

Norman launched a session on Microjoining and Nanojoining in **2008** as part of the symposium on *Joining of Advanced and Specialty Materials*, organized by ASM Joining Critical Technologies Sector, during the annual Materials Science & Technology (MS&T) conferences.

Norman and Akio met for the first time in person during the MS&T-2008 and both had a discussion after the conference in the airport while waiting for flights along with Prof. Jung on joint efforts to continue/increase the number of presentations on Microjoining and Nanjoining at MS&T conferences, and to push for microjoining and nanjoining research in the world.

After this airport meeting, a number of international workshops were also arranged between the University of Waterloo and Osaka University. Drs. Tomokazu Sano (from Akio’ group) and Anming Hu (from Norman’s group) organized the first workshop in **2009** (see the photo below) and our favorable dinner place was Angie’s Kitchen in which we consumed lots of beer and had lots of laughs.



*Osaka-Waterloo workshop at the University of Waterloo on November 4, 2009*

In the above photo, you may be able to identify from the left of the 2<sup>nd</sup> row Drs. Anming Hu, Tomo Ogura, Lei Liu and then in the front row Guisheng Zou, Tomokazu Sano, Norman Zhou, Jae Pil Jung and Shinji Fukumoto. The photos below show we had a good time after the Waterloo-Osaka workshop in Japan in 2011. The next photo shows a dinner party after the MS&T conferences in Pittsburgh in 2012.



*Activities after the Waterloo-Osaka workshop at Osaka University on December 1-2, 2011*



*A dinner during MS&T-2012 in which one student from Osaka University had a 27-ounce steak*



## IIW's New Commission on Microjoining and Nanojoining

On Luisa's invitation, Norman presented a talk at IIW annual meetings on State of the Art in Microjoining and Nanojoining (SG-RES-172-10) in **2010** in her SG-Res, a work unit on Welding Research, Strategy and Collaboration, on growing micro-/nano-joining areas of research, development and applications in industrial sectors (medical, IT, etc).

On the group's recommendation, Luisa proposed and received approval to create a working group on Micro-/Nano-joining (WG-Micro) within SG-RES. WG-Micro had its first workshop in 2011 at the IIW annual meetings, which was so successful that IIW decided to convert it into an independent work unit, Select Committee on Micro-/Nano-joining (SC-Micro) with Norman as Chair, Akio as Vice-chair and Guisheng as Secretary, to focus on this area in which IIW was not addressing significantly.



*Some of the attendees from Canada, China, Japan, Portugal and Ukraine for the IIW's WG-Micro workshop in India in 2011*

After six successful years, on Norman's proposal in **2017**, IIW approved to advance SC-Micro to a full-scale commission C-VII on Microjoining and Nanjoining (Chair: Prof. Norman Zhou, Vice-chair: Prof. Akio Hirose) with three sub-commissions:

- C-VII-A: Joining with nanomaterials (Chair: Dr. Susann Hausner; Vice-chair: Prof. Lei Liu)
- C-VII-B: Laser micro-/nano-joining (Chair: Prof. Guisheng Zou; Vice-chair: Prof. Tomokazu Sano)
- C-VII-C: Emerging micro-/nano-processing technologies (Chair: Prof. Jolanta Janczak-Rusch; Vice-chair: Prof. Anming Hu)

Akio took over as the C-VII Chair in the next three-year period of **2018-2020**. Guisheng is the Chair in the current three-years period of **2021-2023**.

### **International Conferences on Nanjoining and Microjoining**

At the MS&T in 2011, Norman and Akio decided it was the time to launch an international conference series on Nanjoining and Microjoining (NMJ) with its first meeting in China in 2012.

The first NMJ conference was successful held at Tsinghua University in December 2-5, 2012 (with Norman as Chair, Akio as Co-chair and Guisheng as Secretary-General). It included about 100 participants from 12 countries from Asia, Europe and North America (see the photo below).



*Assembly photo of NMJ-2012, Beijing, China*

Prof. Jolanta Janczak-Rusch, an invited speaker from the Swiss Federal Laboratories for Materials Science and Technology (Empa), brought her boss, Dr. Lars Jeurgens the Head of the Laboratory for Joining Technologies & Corrosion at Empa, to the conference. It was discussed during the conference and later decided the NMJ conference would be held every two years and the next one (NMJ-2014) would be in Switzerland to be chaired by Lars and Jolanta (see the photo below).





*Assembly photo of NMJ-2014, Emmetten, Switzerland*

NMJ-2016 was held in Niagara Falls, Canada from September 25-28, 2016 with Mustafa as Conference Chair (see the photos below).



*Conference dinner of the NMJ-2016 in Niagara Falls, Canada*



*Assembly photo of NMJ-2016, Niagara Falls, Canada*

NMJ-2018 was held in Nara, Japan on December 2-5, 2018 with Akio as Conference Chair (see the photo below). It was really pleasant to come back to Nara after our last visit during the Osaka-Waterloo workshop seven years ago (compare with the previous photo at the Waterloo-Osaka workshop, 2011).



*Assembly photo of NMJ-2018, Nara, Japan*

The fifth NMJ conference got hit by the pandemic and will be postponed to 2023 in Leipzig, Germany, to be chaired by Drs. Susann Hausner and Guntram Wagner from the Technical University Chemnitz, Germany.



## International Association on Nanojoining and Microjoining

During NMJ-2018 in Japan, it was proposed to set up a permanent international association on NMJ. The Steering Committee included Akio Hirose from Osaka University, Japan; Norman Zhou from the University of Waterloo, Canada; Anming Hu from the University of Tennessee, Knoxville, USA; Lars Jeurgens from Empa, Switzerland; Jolanta Janczak-Rusch from Empa, Switzerland; Guisheng Zou from Tsinghua University, China and Tomokazu Sano from Osaka University, Japan. Lars has lent his great support and leadership to the community since he joined NMJ-2012 conference. The following photo was taken when Norman visited Lars and Jolanta in 2013 to discuss about the NJM-2014 and more broadly Empa's role in the research area of microjoining and nanojoining (see the photo below).



*Norman visiting Lars and Jolanta from Empa*

The NMJ Association was formally incorporated in 2019 in Switzerland with Lars as the President, Tomokazu as the Secretary and Jolanta as the Treasurer (Attachment).