

## Speakers and Topics

### The Jewelry Symposium – 2023

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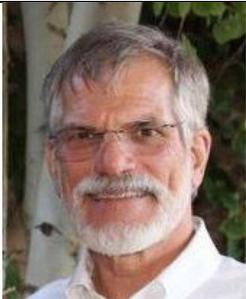
**Nanz Aalund**

Nanz Aalund Art Jewelry

#### **The Apprenticeship Taskforce Report**

The Apprenticeship Taskforce is working on curricula and materials to help jewelry businesses successfully take on apprentices with federal recognition and support. This report will present the work being done to take advantage of new legislation which focuses on supporting apprenticeships. Some questions that will be answered include: What is the legislature that can be applied to for benefits? What kind of support for apprenticeships does it offer? How can Jewelry businesses access these supports?

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**Eddie Bell**

Founder of the  
Santa Fe Symposium

#### **Keynote Speaker**

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**Dr. Carlo Burkhardt**

Scientific Director,  
Institute for Jewellery  
Technology (STI),  
Pforzheim University

#### **Precision Tooling for Stamping and Chasing Made by Additive Manufacturing**

Lithography-based metal manufacturing of stainless steel and tooling steels is an innovative way to make precision parts for industry, automotive, medical and luxury applications. The presented work will explain the process, show the benefits for toolmaking and will give a detailed summary of the processing chain to make individual tooling for stamping and chasing. Examples will be presented, made from CAD data and individual reproduction of existing jewelry and tooling by scanning with an industrial high-resolution scanner and a standard-smartphone, both for stamping tools and chasing tools. As an outlook, a toolbox of chasing tools with changeable, printed tips will be suggested.

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#### **Gemstone Foiling Techniques: Past and Present**



**Jeanette Caines**

Master Jewelry, Jewelry  
Arts Inc.

An examination of gemstone foiling techniques from ancient times to the present. This highly effective technique has been largely forgotten by today's metalsmiths and is due for a revival. The modernization of diamond cutting led to foiling becoming a forgotten technology, despite the large number of metalsmiths who use gemstones besides brilliant cut diamonds. Modern foiling methods are an easy and effective way to improve the light reflection in gemstones and this skill should be a part of the modern metalsmithing lexicon.



**Ralph Carter**

Product Development  
Manager, Ransom &  
Randolph

### **Improving performance of Jewelry investment powder**

In each step of manufacturing jewelry, there are many factors that can adversely affect quality. Because of this, process control is very important. The investing process is one of those steps in which process control is vital. Multiple process factors will be focused on including water quality, the temperature of the water and of the powder, and the water-to-powder mixing ratio. This paper will show how dependent the properties, and thus the performance, of gypsum-based investment are to these factors.



**Dr. Christopher W. Corti**

Managing Director of  
CORGOLD Technology  
Consultancy

### **Basic Metallurgy of the Precious Metals – Part 1: Effect of Alloying on Properties**

The aim of this 'Basic Metallurgy' series is to help jewelers better understand the science and technology underpinning the manufacture of jewelry in their industry, be it by traditional handcraft techniques or by mass manufacture on machines. This is important if they are to produce good product efficiently and avoid defects and other problems that impact quality, time taken and especially costs. In Part I, we look at how alloying affects the properties of the jewelry precious metals and the influence of working and annealing on these properties. This presentation reviews the evolution of platinum alloys over the last century against the challenges – physical and metallurgical - presented in developing improved alloys for jewelry application.



**Dr. Joerg Fischer-  
Buehner**

BluePower Casting  
Systems GmbH  
& Indutherm  
Erwärmungsanlagen  
GmbH

### **Platinum Powder for Additive Manufacturing of Jewelry**

Additive Manufacturing (AM) of jewelry is considered especially interesting for platinum due to several advantages over conventional manufacturing technologies. Its adoption by the jewellery industry so far is limited, however, due to several barriers including the availability of suitable platinum powders. This presentation reports on the development of a new small-scale atomizer and the required process technology for time- and cost-efficient production of platinum alloy powder. The particular challenges for atomizing such alloys at temperatures above 2000°C with a high yield of usable powder and with the desired particle size distribution are

discussed. Examples are shown for 900-950 platinum alloy powders produced for different AM technologies including Laser Powder Bed Fusion (LPBF) or the sinter-based Binder Jetting (BJ) process. It is also shown that fine-tuning of the powder size distribution by post-processing via air-classification is essential. Relevant properties of the powders with respect to AM applications are discussed.

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**Andrea Friso**

R&D and Product  
Manager, Legor Group  
S.p.A. - Italy

**Jewellery Production by Binder Jet Technology**

The presentation is focused on introducing Binder Jet technology in its applications for jewelry making and showing results from one year of use of 3D binder jet printers at our laboratories in Bressanvido, Italy. Binder jetting is still not well known in the jewelry sector, although remarkably known in other industries. It has a remarkably different concept of work from Selective Laser Melting, and our practical experiences over one year of testing and production using it will be shared during the presentation.



**Teresa Fryé**

Founder, TechForm  
Advanced Casting  
Technology, LLC

**Mechanical Properties and Microstructures of Additively Manufactured 950 Platinum Ruthenium Alloy**

Given that additively manufactured (AM) platinum alloys are relatively new to the market, early adopters benefit from increasing data on their material properties. The alloy 95% platinum 5% ruthenium (950 PtRu) is widely used across the United States in cast and fabricated forms, however there is scant data in the literature for AM outputs of this alloy. The present work reports mechanical properties and microstructures for Direct Metal Laser Sintered (DMLS) 950 PtRu in the as-printed and hot isostatic pressed conditions, and further offers comparisons with investment cast samples produced in the same alloy to highlight differences in material properties for each method of manufacture.



**Owain Houghton**

Goldsmiths' PhD Student,  
University of Cambridge,  
UK

**Will They Work? A Proof-of-Concept Study Comparing a 500Pd BMG and Crystalline Alloys for Watch Pieces and Jewelry**

Bulk metallic glasses based on precious metals offer exceptional hardness compared to conventional crystalline alloys. They can be processed like plastics via routes analogous to injection molding with excellent as-cast surface finish and far shorter cycle times compared to conventional investment casting of crystalline alloys. The properties of these alloys were presented and discussed at the 34<sup>th</sup> Santa Fe Symposium. Amongst many potential applications are hallmark-compliant watch casings and jewelry. For the former, current

co-author  
**Lisa-Yvonn Schmitt**

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fem, Germany

hallmarked alloys are generally too soft. Results of accelerated lab tests and real-life wear tests for a Pd500 BMG in comparison with comparable crystalline alloys are presented, to assess the suitability of BMGs for watch and jewelry. The outcomes are discussed and critically evaluated to understand the suitability of these alloys now and in the future.



**Ramarao Ilavarapu**

Sr. Vice President  
Operations,  
Sunjewels Pvt. Ltd

**Design & Development of Semi-Automatic Gemstone Setting Machine & Functional Testing Machines in Jewellery Manufacturing**

Functional tests are used in engineering, aerospace & defense industries to ensure product reliability & durability. The functional testing machines designed and manufactured by Sunjewels ensure the reliability of product mechanisms like clasps, hinge mechanisms, etc. This will enhance the customer confidence in the product. Setting gemstones and diamonds in jewellery requires a highly skilled workforce. Precision is the deciding factor as it entails the final look of the jewelry. Accuracy plays a significant role as it impacts the jeweler's finishing which increases manual labor costs. We have designed & developed a specially purposed machine to set gemstones in the product, and a software program for a three-axis CNC machine to produce dimensionally accurate seats which are shaped to match the gemstone. Mechanization of gemstone setting helps to ensure consistent output with increased productivity.



**Dr. Ulrich Klotz**

Research Institute for  
Precious Metals & Metal  
Chemistry (fem)

**Platinum-Based Bulk Metallic Glasses for Jewelry Applications**

Precious based bulk metallic glasses (BMG) are interesting materials for jewelry and watch making applications due to their properties such as high as-cast hardness, corrosion resistance, and outstanding surface quality. However, high critical cooling rates are required to achieve amorphous solidification which implies challenges for their manufacturing. Thus, they are cast in metallic molds which strongly limits the geometric complexity of cast parts. The present work focuses on the process development for investment-based casting of Pt-P-Cu based BMGs in order to allow for jewelry casting on an industrial scale. The results of centrifugal and vacuum-die casting applied for two different alloys are presented. One of the alloys contains 74wt% Platinum and shows a high glass forming ability, whereas the other alloy has 85wt% Platinum with a significantly lower glass forming ability. Cast filigree jewelry parts with an outstanding surface quality have been demonstrated.

**Stainless Steel at the bench, Why and How**



## **Chris Ploof**

Chris Ploof Designs

Today, many companies manufacture jewelry from stainless steel. This is especially attractive with the high prices of precious metals. There is little jewelry manufacturing information published for those that sit at the bench and who may come across stainless steel or desire to create with it. This presentation will remove the mysteries of working with stainless steel in the small shop setting, detail common, readily available alloys, highlight steps for working with stainless steel, as well as showcase examples of stainless steel jewelry in production today. From the skills necessary to touch up a stock piece of stainless steel jewelry all the way through cutting, fabricating, machining, soldering and finishing, this paper will leave the reader with the skills necessary to work with stainless steel and also how to combine it with precious metals.



## **G. Phil Poirier**

CEO, Bonny Doon  
Engineering and Poirier  
Studio

### **Latest Findings of the Ornamental Lathe**

The paper will expose readers to an old technology, the ornamental lathe, which is in the midst of a grand revival. Many jewelers and watchmakers around the world are developing new uses and new designs with the help of these machines. New machines are coming on the market to help fill the needs. The most recent advances in the techniques and processes along with examples of finished work will be presented.



## **Pat Pruitt**

**Pat Pruitt – Metalsmith**

### **Accessible Technology Has Never Been Better**

This presentation will illustrate advancements in a couple of different fields, some related to the jewelry industry, others not, how they can be incorporated into the jewelry industry, and how we as jewelers can use these technologies to aid us in the fabrication and production of what we currently do.

In addition, it will illustrate when the advancements in a field go far enough, it drives down the price of the technology to become attainable to some studio jewelers and others. The caveat is that when the price goes down, most times, the technical support diminishes as well. Lastly, how to have fun with a variety of technologies (in general) to explore and develop new concepts, ideas, and product for the studio jeweler.

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### **Powder Density vs. Strength**



**Dr. Joseph Tunick  
Strauss**

President,  
HJE Co., Inc.

co-author  
**G. Phil Poirier**

CEO, Poirier Studio



**Damiano Zito**

Progold

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**The Use of ED-XRF Technology to Measure Gold and Silver Title After the Introduction of ISO22345.**

ED-XRF analysis techniques are becoming increasingly popular in the jewelry industry. The possibility of measuring a finished object of even complex shape, without destroying or ruining it, very quickly, is a unique attraction compared to other conventional techniques (e.g., ICP or fire assay). Despite their relative popularity, however, X-ray fluorescence-based techniques were generally relegated to a marginal role, limited to checking the rough composition, due to the perception that this type of measurement is inaccurate. Calibrating the analyzer with good references, choosing specific measurement parameters, and understanding the structure of the analyzed jewelry are fundamental in allowing much more precise and accurate measurements. In our tests, we work with and on the new ISO 23345, which defines calibration, measurement, and interpretation of data for fineness analysis by ED-XRF.

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