

**Einladung zum Fertigungstechnischen Kolloquium  
vom 25. November 2020, 14:15-17:40 Uhr**

**„Experimental and virtual methods for materials, failure  
criteria and process modeling“**

*Elektrotechnikgebäude ETH Zürich, Hörsaal ETZ E8, Gloriastrasse 35, 8092 Zürich*

**Improving Electric Vehicle Safety - Battery Experiments and Advanced Modeling**

*Dr. Thomas Tancogne-Dejean, ETH*

With the advent of electric vehicles (EV), improving battery crashworthiness has seen a major rise in demand over the course of the last years. The increased energy density in modern battery packs of an EV can potentially lead to thermal runaway, fire, and explosion upon accidental mechanical loading. In this talk we focus on battery experiments over a range of strain rates and stress states. Advanced modeling techniques are employed to describe the material response in Finite Element simulations.

**Universal Material Modeling Using Recurrent Neural Networks**

*Dr. Colin Bonatti, ETH*

Neural networks are universal function approximators that form the backbone of most modern machine learning based models. Very recent research has shown that these machine learning approaches can be used to describe classic von Mises plasticity in a finite element simulation. In the present talk we focus on the potential of this technique to be used in developing a universal material model that can describe several classes of materials.

**Material Behavior under the Effect of Strain Rate and Temperature: Experiments and Modeling**

*Dr. Christian Roth, ETH*

From forming operations to accidental crash loading and impact, the effect of strain rate and temperature play a role in many applications of our everyday life. A better understanding and the ability to describe the material response accurately will result in more accurate numerical predictions and eventually better products. In this talk experimental techniques for a range of strain rates, stress states and temperatures are presented along with numerical models to describe the material behavior in finite element simulations.

**Optimizing Self Piercing Rivets – A Numerical and Experimental Study**

*Dr. Kedar Pandya, ETH*

Self-piercing riveting (SPR) is the predominant technique to efficiently join two or more mixed material, lightweight sheet metal parts in the automotive industry. Developing robust numerical simulation tools to investigate the SPR process is critical, since the feasibility, quality and strength of riveted connections relies on the successful formation of a mechanical interlock between the rivet and sheet materials. We investigate the influence of a wide range of process parameters on the joining and fracture characteristics of the riveted connection, with the goal of optimizing the joint strength by employing finite element and machine learning methods. An experimental validation of the SPR process and fracture characteristics is presented and compared with the numerical results.

**Fertigungstechnisches Kolloquium: „Experimental and virtual methods for materials, failure criteria and process modeling“**

**Datum:** Mittwoch, 25. November 2020, 14:15 – 17:40 Uhr

**Ort:** Elektrotechnikgebäude ETH Zürich, Hörsaal ETZ E8, Gloriastrasse 35, 8092 Zürich

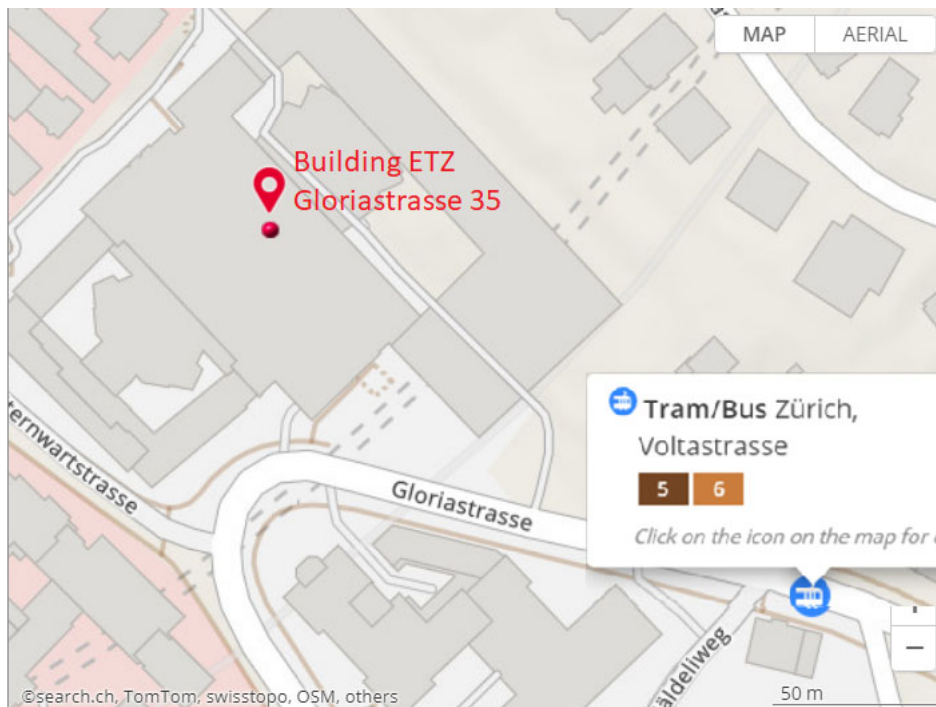
Eine Voranmeldung ist nicht nötig. Programmänderungen sind jederzeit möglich. Keine Parkplätze. Wir freuen uns auf Ihre Teilnahme!

Es gibt auch die Möglichkeit einer online-Teilnahme, Zugangsdaten siehe E-Mail

**Programm:**

- 14:15-14:30 Begrüssung durch Prof. Dr. Konrad Wegener, IWF ETH Zürich
- 14:30-15:05 Improving Electric Vehicle Safety - Battery Experiments and Advanced Modeling  
Dr. Thomas Tancogne-Dejean, ETH
- 15:05-15:40 Universal Material Modeling Using Recurrent Neural Networks  
Dr. Colin Bonatti, ETH
- 15:40-16:10 Pause
- 16:10-16:45 Material Behavior under the Effect of Strain Rate and Temperature: Experiments and Modeling  
Dr. Christian Roth, ETH
- 16:45-17:20 Optimizing Self Piercing Rivets – A Numerical and Experimental Study  
Dr. Kedar Pandya, ETH
- 17:20-17:30 Abschluss

**Elektrotechnik Zentralgebäude**



**Bitte reservieren Sie sich auch die Termine der weiteren Fertigungstechnischen Kolloquien**

09.12.2020: „Neue Fertigungstechnologien im AM-Bereich“

jeweils am Mittwochnachmittag im ETZ E8