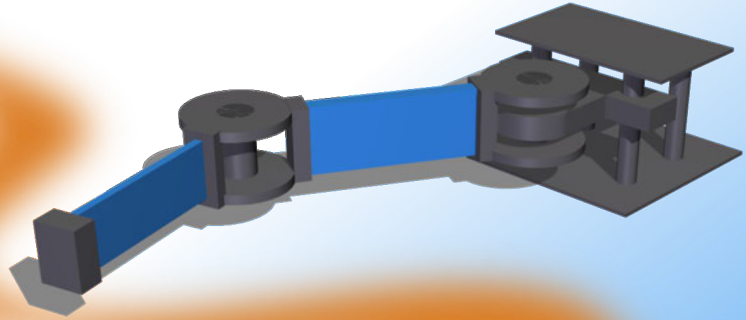


# Symposium Information Booklet

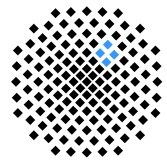


IUTAM Symposium on

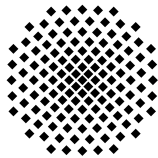
## Dynamical Analysis of Multibody Systems with Design Uncertainties

Stuttgart, Germany  
**June 10 – 13, 2014**

[www.itm.uni-stuttgart.de/iutam2014](http://www.itm.uni-stuttgart.de/iutam2014)



## Supporting Organizations



University of Stuttgart



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## Industrial Sponsors



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Welcome to the  
IUTAM Symposium on  
Dynamical Analysis of Multibody Systems  
with Design Uncertainties

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# Welcome to the Symposium

## Aims and Scope

A common problem in the analysis of mechanical systems is the fact that the parameters of the models can exhibit a high level of uncertainty and exact values for their quantification can often not be provided. This non-determinism in numerical models may arise as a consequence of different sources. On the one hand, there may be natural variability or scatter. On the other hand, there may be uncertainties which arise from a lack of information, e.g. for parameters to be still defined during the design phase of a product, but also from simplification and idealization as it usually appears in every modeling procedure. These conditions manifest as uncertain model parameters. Consequently, the results that are obtained for analyses of systems that only use one specific set of values as the most appropriate ones for the design parameters cannot be considered as reliable, for they are not representative of the whole spectrum of possible model configurations. Against this background, various approaches to the inclusion of uncertainties in the numerical analysis of dynamical systems and structures have been introduced in the past decades, involving probabilistic as well as non-probabilistic techniques. Supported by the increasing capabilities of modern high-performance computing, these advanced, non-deterministic approaches to the dynamical analysis of mechanical systems can strengthen the trustworthiness of numerical predictions and provide new possibilities in the processes of product development, such as engineering design and virtual prototyping, beyond the means of conventional, deterministic concepts.

The aim of this IUTAM Symposium is to give a state of the art of the potentials, challenges and limitations of different approaches to the analysis of mechanical systems in the presence of design uncertainties. The topics will range from probabilistic methods to approaches based on interval descriptions or fuzzy sets, from linear to nonlinear problems, from forward analyses to inverse problems, from theoretical developments to practical applications, and from the analysis of structures to multibody systems dynamics.

## Presentation of Papers

Each presentation will be 30 minutes, followed by 10 minutes for questions and discussion.

A Windows notebook for beamer presentation of PowerPoint or PDF slides will be available in the lecture hall as well as an overhead projector for printed slides.

## Scientific Committee

The Symposium is supervised by an International Scientific Committee:

Michael Hanss, Germany (chair)

Alexander Belyaev, Russia

Harry Dankowicz, USA

Wim Desmet, Belgium

Haiyan Hu, China

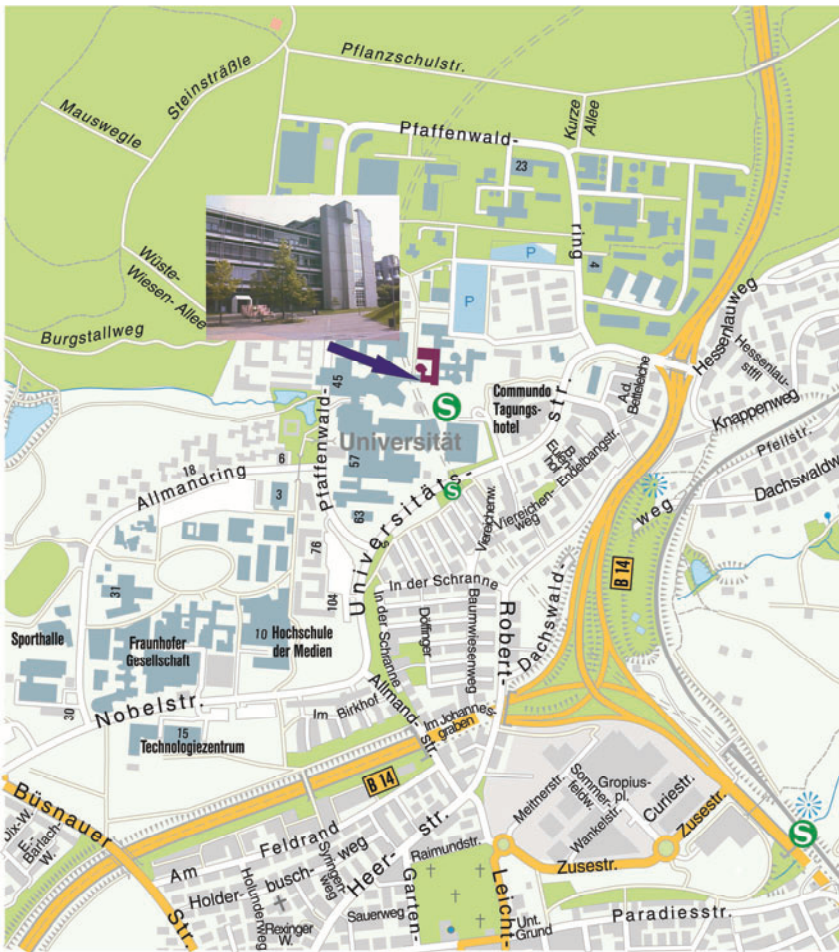
Robin Langley, United Kingdom

Christian Soize, France

IUTAM Representative:

Peter Eberhard, Germany

## Symposium Venue



### Campus Vaihingen

The symposium will take place in the lecture room 9.01 of the University of Stuttgart in Stuttgart-Vaihingen in the building Pfaffenwaldring 9. The emblem with the white 'S' on a green background denotes the underground train station.



## Site Plan of the Symposium Venue



# This is Stuttgart, Germany

## A Little about Germany

Germany, officially the Federal Republic of Germany, is a federal parliamentary republic in Europe. The country consists of 16 states while the capital and largest city is Berlin. Germany covers an area of 357 021 km<sup>2</sup> and has a largely temperate seasonal climate. With 81.8 million inhabitants, it is the most populous member state and the largest economy in the European Union. It is one of the major political powers of the European continent and a technological leader in many fields.



## Map of Germany and Baden-Württemberg

Stuttgart is the capital of the state of Baden-Württemberg in Southern Germany.



Opera of Stuttgart

## The Stuttgart Region

*Inventive, cultivated, relaxing and enticing at the same time*

In the Stuttgart Region, nature goes hand in hand with technology, and tradition with innovation. Its architecture is both baroque and modern. It spans the diversity of the pulsating economic metropolis and a wealth of culture on the highest level. All of this is to be found amidst an idyllic, topographically appealing scenery.

The Stuttgart Region comprises 179 towns and communities, divided into five administrative districts and the municipality of Stuttgart. About 2.7 million people of around 170 different nationalities live here, 581 092 of them in Stuttgart. The state capital's main landmark is the Television Tower – the first of its kind worldwide.

Stuttgart owes its name to a stud farm, or "Stuotgarten", which Duke Liudolf of Swabia is said to have founded in 950 AD. To defend this stud farm, the Old Castle was built. The New Castle was the residence of the kings of Württemberg up to the middle of the 19<sup>th</sup> century. Today the building contains ministries of the Baden-Württemberg state government and state reception rooms.

The Castle Square is the most central part of Stuttgart. It is an absolute must when enjoying a stroll through the city because



## Did you know ...

that Stuttgart is the city with the largest elevation variation out of all German major cities? The city area stretches over a difference in elevation of 342 meters. Therefore, you can climb in Stuttgart the most stairways of all German cities with a stretch of 30 kilometers in length.

.....

this is where the city's heartbeat can best be felt. It is bordered by the Königstraße, Europe's longest pedestrian zone and shopping area, 1.2 km in length.



Königstraße in the city center, one of the most frequented shopping streets in Germany

The Landtag, the State Parliament building, is located in the Upper Castle Gardens. Directly adjacent are the Staatstheater Stuttgart, Europe's largest triple-branch theater, comprising Stuttgart State Opera, the world-famous Stuttgart Ballet and the Schauspiel Stuttgart theater company.

A wide diversity of museums rounds off the culture scene. The Stuttgart Museum of Art has the world's most outstanding collection of the oeuvre of Otto Dix. The Stuttgart State Gallery has works from 700 years on display and is one of the most visited museums in the country.

## Europe's largest high-tech region



The Stuttgart region is a main center for:

- the automotive industry
- mechanical engineering
- information and communication technology
- environmental technology

Stuttgart is spread across a variety of hills (some of them vineyards), valleys and parks – unusual for a German city and often a source of surprise to visitors who primarily associate the city with its industrial reputation as the "cradle of the automobile".



Television Tower – Landmark of the city and the first in the world built of ferroconcrete

# University of Stuttgart

## A Research University of International Standing

The University of Stuttgart lies right in the center of the largest high-tech region of Europe. It is surrounded by a number of renowned research facilities and has such global industrial players as Daimler or Bosch as its neighbors.

It was founded in 1829, and over the years, this technical institution has evolved into the research intensive university that it is today. Its main emphasis lies on engineering and the natural sciences. However, combining these areas with humanities and the social sciences adds something special to its profile.

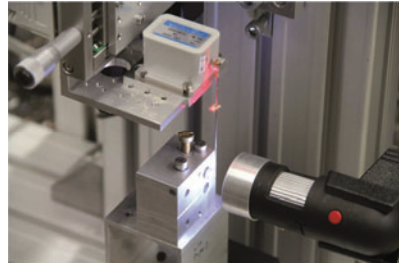
Indicators of its excellent status are projects like the Excellence Cluster "Simulation Technology". The university is also involved in a number of Collaborative Research Centers and Research Training Groups.

The research activities are concentrated around eight interdisciplinary areas:

- Modeling and simulation technology
- New materials
- Complex systems and communication



Education and training for scientists of different engineering disciplines



Test setup for monitoring the contact force at a middle-ear prosthesis

- Technology concepts and technology assessment
- Energy and environment
- Mobility
- Integrated product and production design
- Design and technology of sustainable living spaces

The University of Stuttgart is going to strengthen its research through interdisciplinary networks of cooperation in order to continue to expand its cutting-edge position in these fields. It is going to increase its international presence and concentrate on themes that are of central importance for its future.

Behind all this lies the vision of undertaking research on the whole life cycle of a product. This involves not only the engineering implementation but also the evaluation of the sustainability of the technical innovations.



## Did you know ...

that the "Tagblatt-Tower" (publisher of a local newspaper) was the first skyscraper in Stuttgart with its 61 meters and 18 floors, built in 1928?

## Faculties

- Architecture and Urban Planning
- Civil and Environmental Engineering
- Chemistry
- Energy-, Process- and Bio-Engineering
- Computer Science, Electrical Engineering and Information Technology
- Aerospace Engineering and Geodesy
- Engineering Design, Production Engineering and Automotive Engineering
- Mathematics and Physics
- Humanities
- Management, Economics and Social Sciences

## At a glance

- ~ 5 150 employees
- ~ 3 000 scientific staff
- ~ 250 professors
- ~ 26 500 students enrolled at 10 faculties
- ~ 4 800 international students from more than 100 countries all over the world
- ~ 110 study programs
- 8 MSG Programs taught in English
- ~ 400 partner universities worldwide
- annual budget of ~ 400 000 000 Euro

The University of Stuttgart has become one of the most popular education institutions worldwide for the subjects we offer. Around 26 500 students are enrolled in the courses offered by the 150 institutes in the 10 different faculties.

It offers about 75 degree programs. It also has seven international MSc-degree programs taught entirely in English. In addition, the university offers numerous activities that are tailored for its international partners.



The lecture halls are well filled



Modern buildings on the Campus Vaihingen

## Useful Information

### Tickets and Transportation

You can ride all streetcars, suburban railways and buses within the metropolitan Stuttgart area with a VVS ticket. VVS means Transit and Tariff Association Stuttgart (German: Verkehrs- und Tarifverbund Stuttgart). We recommend you to buy a single ride ticket (German: Einzelticket) for two zones for your journey from the airport to the University Campus Vaihingen or from the main station to the University Campus Vaihingen or vice versa. Step off at the station "Universität".

Also for the journey from the University Campus Vaihingen to the symposium reception, a two-zones ticket is required.

**A single ride ticket** entitles the rider to one ride in the one direction, but changing lines as well as short ride interruptions are permitted. The tickets remain in effect for two hours from purchase. The price for two zones is 2.70 Euro.


You can buy your ticket from the ticket machines. You will find them close to the entry of the suburban railway stations. Unfortunately, you will not find the ticket machines directly on the platform of the suburban railways or in the trains.

**Single-day tickets** with an unlimited number of rides or a **discounted multitrip travel card with four single tickets** are also available from the ticket machines.

**The three-day ticket** is an attractive offer designed for overnight guests at hotels and guest houses within the VVS territory. Please ask for a three-day-ticket in your hotel.

A map of the railway network is contained in the conference bag.

## How to Arrive at the University Campus Vaihingen

From Stuttgart main station (German: Hauptbahnhof) or from Stuttgart city center (German: Stadtmitte), you should take one of the following suburban railways (German:  S-Bahn) which travel every 10 minutes. It takes you about 10 minutes to get from the main station to the University Campus Vaihingen (German: Universität):

- S1: Direction Boblingen / Herrenberg
- S2: Direction Vaihingen / Filderstadt
- S3: Direction Vaihingen / Flughafen / Messe

Leave the train at the station University (German: Universität) which is very close to the Symposium venue.

After arriving at the platform, take the exit to the University Campus (German: Universitätszentrum), and after going up by elevator or stairways, you are already in front of the conference building. If you take the wrong exit and find yourself in a living area, don't worry. The university is just a two minutes walk away.

## Useful Addresses and Phone Numbers

### Emergency number 112

In case of an emergency, call 112. This number will connect you to the police, ambulance or fire department. The emergency number does not require an area code, and the phone call is free.

### Taxi

A taxi from the University Campus Vaihingen to the city center or vice versa costs about 25 Euro but the suburban railway (German: S-Bahn) is faster and cheaper. A telephone number to reserve a taxi is 0049 (0) 711-5590721.

## Practical Matters

**German time** is 1 hour ahead of Greenwich Mean Time, i.e. UTC+1, in summer (from March to October) 2 hours ahead of Greenwich Mean Time, i.e. UTC+2.

**Supermarkets** are usually open from 8 a.m. until 8 p.m. on weekdays (Monday to Saturday). Shops are usually open from 9.30 a.m. until 8 p.m. on weekdays (Monday to Saturday). On Sundays and public holidays (like Monday, June 9, 2014), supermarkets and shops are closed.

**Prices** in Germany already contain value-added tax (VAT). Additional tips in the amount of 5-10% of the bill are usual in restaurants.

**Post offices** and mailboxes are yellow and exhibit the label "Deutsche Post".

The **tap water** in Germany is safe to drink.

The **voltage** in Germany is 220V (230 V), 50 Hz. Round "European" two-pin plugs and sockets are used.

Only **pharmacies** (German: Apotheke) sell medicines. They are usually open from 9.30 a.m. until 8 p.m. on weekdays (Monday to Saturday).

**Coffee breaks** will usually take place twice a day, in the morning and in the afternoon in the foyer in front of the lecture hall.

**Lunches** are served between 1 p.m. and 2 p.m. in the restaurant of the Commundo Tagungshotel, Universitätsstraße 34.

**Wireless internet** is available for the conference participants in the conference venue. Eduroam can also be used. Logins and passwords will be given at the registration desk.

## Common Expressions in German Language

|                           |                           |                |            |
|---------------------------|---------------------------|----------------|------------|
| Germany.....              | Deutschland               | Entrance.....  | Eingang    |
| Hello!.....               | Hallo                     | Exit.....      | Ausgang    |
| Bye!.....                 | Tschüss                   | Help!.....     | Hilfe      |
| Goodbye!.....             | Auf Wiedersehen           | one.....       | eins       |
| See you later.....        | Bis später!               | two.....       | zwei       |
| Yes.....                  | Ja                        | three.....     | drei       |
| No.....                   | Nein                      | four.....      | vier       |
| Thank you!.....           | Danke                     | five.....      | fünf       |
| You're welcome!.....      | Bitte!                    | six.....       | sechs      |
| Excuse me.....            | Entschuldigung            | seven.....     | sieben     |
| My name is.....           | Ich heiße ...             | eight.....     | acht       |
| I'd like ... ..           | Ich hätte gerne ...       | nine.....      | neun       |
| How much is it ...? ..... | Was kostet ...?           | ten.....       | zehn       |
| Could we pay please?..    | Zahlen bitte.             | Monday.....    | Montag     |
| I don't understand. ....  | Ich verstehe Sie nicht.   | Tuesday.....   | Dienstag   |
| I don't speak German..    | Ich spreche kein Deutsch. | Wednesday..... | Mittwoch   |
| Do you speak English?.    | Sprechen Sie Englisch?    | Thursday.....  | Donnerstag |
| How are you?.....         | Wie geht es Ihnen?        | Friday.....    | Freitag    |
| Where is the washroom?    | Wo ist die Toilette?      | Saturday.....  | Samstag    |
|                           |                           | Sunday.....    | Sonntag    |

# Social Program

## Registration and Welcome Reception

### University of Stuttgart

The symposium pre-registration will take place on **Monday, June 9, 2014, from 6 p.m. until 8 p.m.** in the Institute of Engineering and Computational Mechanics (ITM), Pfaffenwaldring 9, 4<sup>th</sup> floor. The pre-registration is accompanied by a welcome reception where the participants have the first opportunity to meet each other.

Please note that this day is a public holiday in Germany and shops are closed.

The regular registration will start on **Tuesday, June 10, 2014 at 9 a.m.** in front of the lecture hall 9.01, at the registration desk.



Campus Vaihingen, University of Stuttgart





## Symposium Reception

### Marmorsaal im Weissenburgpark

On **Tuesday evening, June 10, 2014, at 6.00 p.m.**, the symposium reception will take place at the Marmorsaal (Marble Hall) in the Weissenburg Park

*Weissenburg Park* begins directly on the *Weinsteige* at the foot of the *Bopser Hill*. Formerly in private ownership, it was acquired by the city of Stuttgart in 1956 and redesigned as a public park.



Marble Hall - today -



Marble Hall - 1912 -

From the benches on the panorama plateau, there is a marvelous view over Stuttgart's city center and there are also lots of smaller seating areas that are ideal for picnics. On a knoll in the park, the *Teahouse* and the *Marble Hall* now welcome visitors as a restaurant and event location.





## Excursion

All participants of the symposium are kindly invited to the excursion to the *Porsche Museum* and to the Unesco World Heritage Site *Maulbronn Monastery*. We will start on **Thursday, June 12, 2014, at 2 p.m.**

### Porsche Museum

A vision becomes reality. Immediately next to the headquarters of Dr. Ing. h.c. F. Porsche AG in Stuttgart-Zuffenhausen, you can today find one of the most spectacular car museums in the world – the Porsche Museum. Be inspired by over 80 vehicles on the 5 600 square meter exhibition area.

The Porsche Museum covers all the historical and contemporary knowledge relating to the Porsche brand, allowing everyone to experience the fascination of Porsche.

The exhibition guides the visitor through the company's product history. The "Porsche Idea" has always inspired the company in its quest to find pioneering technical solutions to the fundamental challenges encountered in automotive manufacturing. It is based on characteristic attributes such as "Fast", "Light", "Clever", "Powerful", "Intense" and "Consistent".



## Maulbronn Monastery



Maulbronn Monastery (Kloster Maulbronn) is one of Europe's most complete and best-preserved medieval monastery complexes. It combines a multitude of architectural styles, from Romanesque to late Gothic, in one place – creating a unique atmosphere.

The construction of the former Cistercian abbey, cradled in the rolling hills of the Stromberg region, commenced in 1147. It was here that gothic design was first implemented in the German-speaking world. In 1993, the monastery was declared a UNESCO World Heritage site.

### The Fountain House



The house with the three-shell fountain is one of the most popular motifs in Maulbronn. The fountain house was used by the monks for cleaning, for ritual ablutions and for cutting their tonsures. Its fresh water reached

the well house from mountain springs north of the monastery.



The two most famous views, the so-called paradise and the three-basin fountain, are displayed on this special edition of the 2-euro coin.

*-a memorable souvenir-*

## Symposium Dinner








### Zum treuen Bartel, Markgröningen

The symposium dinner will be held on **Thursday evening, June 12, 2014, at 7 p.m.** in the restaurant *Zum treuen Bartel* in *Markgröningen*.



## Transfer for Social Events

Individual arrival to the symposium reception at the Marmorsaal in Weissenburgpark

On **Tuesday evening, June 10, 2014**, please use the suburban railway  S1 (Direction: Kirchheim / Teck),  S2 (Direction: Schorndorf) or  S3 (Direction: Backnang) from the University Campus Vaihingen (German; Universität) to the station "Hauptbahnhof". Change to the train  U5 (Direction: Leinfelden),  U6 (Direction: Fasanenhof),  U7 (Direction: Ostfildern) or  U12 (Direction: Möhringen) and step off at the fifth stop, the station "Bopser".

**You need a valid ticket for two zones.**

A separate flyer with directions to the symposium reception will be provided at the conference desk and with your conference material. Please use the map on that flyer to get to the Marmorsaal by foot, or follow our staff in the blue shirts.

Alternatively, scan the following QR code for mobile navigation (via Google Maps) starting from the station "Bopser".



Shuttle bus to the Porsche Museum, Maulbronn Monastery and the symposium dinner

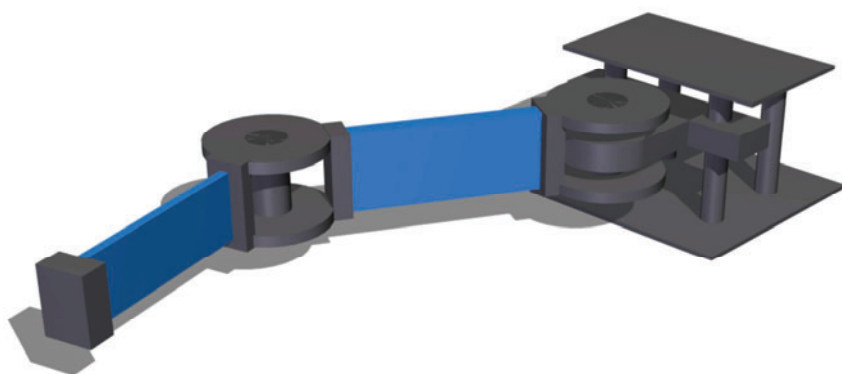
A shuttle bus will depart on **Thursday, June 12, 2014, at 2 p.m.** at the University of Stuttgart, bringing the participants directly to the Porsche Museum, to the Maulbronn Monastery and later to the symposium dinner in Markgröningen.



The shuttle bus departs close to the building in Pfaffenwaldring 9 in front of the Commundo Tagungshotel

At the end of the symposium dinner, there will be a bus shuttle back to the University Campus Vaihingen. More details will be given during the symposium.

## Scientific Program



# Program Overview

## Monday, June 9, 2014

|       |   |       |  |
|-------|---|-------|--|
| 18:00 | - | 20:00 | Pre-Registration and Welcome Reception - ITM, Pfaffenwaldring 9, 4th floor |
|-------|---|-------|--|

## Tuesday, June 10, 2014

|                                    |  |       |  |
|------------------------------------|--|-------|--|
| 9:00                               | -  | 9:50  | <b>Registration</b><br>Pfaffenwaldring 9, ground floor |
| 9:50                               | -  | 10:20 | Welcome Session  |
| Session TueMor, Chair: F. Casciati |  |       |  |
| 10:20                              | -  | 11:00 | TueMor 1   |
| 11:00                              | -  | 11:30 | Coffee Break   |
| 11:30                              | -  | 12:10 | TueMor 2   |
| 12:10                              | -  | 12:50 | TueMor 3   |
| 13:00                              | -  | 14:00 | Lunch  |
| Session TueAft, Chair: S. Adhikari |  |       |  |
| 14:00                              | -  | 14:40 | TueAft 1   |
| 14:40                              | -  | 15:20 | TueAft 2   |
| 15:20                              | -  | 15:50 | Coffee Break   |
| 15:50                              | -  | 16:30 | TueAft 3   |
| 16:30                              | -  | 16:40 | Announcement   |
| 18:30                              | Symposium Reception - Marmorsaal ("Marble Hall") |       |  |

## Wednesday, June 11, 2014

|                                  |   |       |              |
|----------------------------------|---|-------|--------------|
| Session WedMor, Chair: W. Desmet |   |       |              |
| 9:00                             | - | 9:40  | WedMor 1     |
| 9:40                             | - | 10:20 | WedMor 2     |
| 10:20                            | - | 11:00 | WedMor 3     |
| 11:00                            | - | 11:30 | Coffee Break |
| 11:30                            | - | 12:10 | WedMor 4     |
| 12:10                            | - | 12:50 | WedMor 5     |
| 13:00                            | - | 14:00 | Lunch        |
| Session WedAft, Chair: C. Proppe |   |       |              |
| 14:00                            | - | 14:40 | WedAft 1     |
| 14:40                            | - | 15:20 | WedAft 2     |
| 15:20                            | - | 15:50 | Coffee Break |
| 15:50                            | - | 16:30 | WedAft 3     |
| 16:30                            | - | 17:10 | WedAft 4     |
| Evening at your disposal         |   |       |              |

### Thursday, June 12, 2014

| Session ThuMor, Chair: W. Schiehlen |       |              |
|-------------------------------------|-------|--------------|
| 9:00                                | 9:40  | ThuMor 1     |
| 9:40                                | 10:20 | ThuMor 2     |
| 10:20                               | 11:00 | ThuMor 3     |
| 11:00                               | 11:30 | Coffee Break |
| 11:30                               | 12:10 | ThuMor 4     |
| 12:10                               | 12:50 | ThuMor 5     |
| 13:00                               | 14:00 | Lunch        |
| 14:00                               | 17:30 | Excursion    |
| 19:00                               | 23:00 | Dinner       |

### Friday, June 13, 2014

| Session FriMor, Chair: P. Eberhard |       |                 |
|------------------------------------|-------|-----------------|
| 9:00                               | 9:40  | FriMor 1        |
| 9:40                               | 10:20 | FriMor 2        |
| 10:20                              | 11:00 | FriMor 3        |
| 11:00                              | 11:30 | Coffee Break    |
| 11:30                              | 12:10 | FriMor 4        |
| 12:10                              | 12:50 | Closing Session |
| 13:00                              | 14:00 | Lunch           |

# Detailed Technical Program

**Tuesday, June 10, 2014**

|  |                      |
|--|----------------------|
| <b>TueMor 1</b>  | <b>10:20 - 11:00</b> |
| An estimation approach for uncertain parameters in multibody systems   |                      |
| <u>Frank Naets</u> , Wim Desmet  |                      |
| <b>TueMor 2</b>  | <b>11:30 - 12:10</b> |
| Fault detection and isolation for a railway vehicle by evaluating estimation residuals   |                      |
| <u>Mathias Jesussek</u> , Katrin Ellermann   |                      |
| <b>TueMor 3</b>  | <b>12:10 - 12:50</b> |
| The probabilistic solution of the plate with simple-supported and stretched boundary and uniform load being Gaussian white noise |                      |
| <u>Guo-Kang Er</u> , Vai Pan lu  |                      |
| <b>TueAft 1</b>  | <b>14:00 - 14:40</b> |
| Inverse fuzzy arithmetic for the quality assessment of substructured models  |                      |
| <u>Igor Iroz</u> , Sergio Carvajal, Michael Hanss, Peter Eberhard  |                      |
| <b>TueAft 2</b>  | <b>14:40 - 15:20</b> |
| Parameterized nonlinear model reduction for multibody simulation with uncertain parameters                                       |                      |
| Tommaso Tamarozzi, Frank Naets, <u>Wim Desmet</u>  |                      |
| <b>TueAft 3</b>  | <b>15:50 - 16:30</b> |
| An approach to the dynamics and control of uncertain multi-body systems  |                      |
| <u>Thanapat Wanichanon</u> , Hancheol Cho, Firdaus E. Udwadia  |                      |



## Wednesday, June 11, 2014

|   |                      |
|---|----------------------|
| <b>WedMor 1</b>   | <b>09:00 - 09:40</b> |
| Collocation-based stochastic modeling of uncertain geometric mistuning in bladed rotor<br><u>Kheirollah Sepahvand</u> , Khaled Nabih, Steffen Marburg   |                      |
| <b>WedMor 2</b>   | <b>09:40 - 10:20</b> |
| Polynomial chaos expansion-based generalized divide-and-conquer algorithm for the uncertainty analysis of large multibody systems<br><u>Mohammad Poursina</u>                                       |                      |
| <b>WedMor 3</b>   | <b>10:20 - 11:00</b> |
| Application of polynomial chaos expansion and model order reduction for dynamic analysis of structures with uncertainties<br><u>Ji Yang</u> , Beatrice Faverjon, Herwig Peters, Nicole Kessissoglou |                      |
| <b>WedMor 4</b>   | <b>11:30 - 12:10</b> |
| Stochastic analysis of base-isolated liquid storage tanks using lumped-model<br><u>Kheirollah Sepahvand</u> , Sandip Kumar Saha, Vasant A. Matsagar, <u>Steffen Marburg</u>                         |                      |
| <b>WedMor 5</b>   | <b>12:10 - 12:50</b> |
| Spectral methods for fuzzy structural dynamics: Modal vs direct approach<br><u>Sondipon Adhikari</u> , Hamed H. Khodaparast   |                      |
| <b>WedAft 1</b>   | <b>14:00 - 14:40</b> |
| Analysis of design uncertainties in structurally optimized lightweight machines<br><u>Robert Seifried</u> , Ali Moghadasi   |                      |
| <b>WedAft 2</b>   | <b>14:40 - 15:20</b> |
| The importance of imperfections in leaf-spring flexures for the support stiffness<br><u>Jaap P. Meijaard</u>  |                      |
| <b>WedAft 3</b>   | <b>15:50 - 16:30</b> |
| Modelling for design of compliant mechanisms with manufacturing uncertainties<br><u>Ronald Aarts</u> , Dannis Brouwer, Wouter Hakvoort  |                      |
| <b>WedAft 4</b>   | <b>16:30 - 17:10</b> |
| Robust design in multibody dynamics - application to vehicle ride-comfort optimization<br><u>Anas Batou</u> , Christian Soize, C. K. Choi, H. H. Yoo  |                      |

## Thursday, June 12, 2014

|   |                      |
|---|----------------------|
| <b>ThuMor 1</b>   | <b>09:00 - 09:40</b> |
| Influence of uncertainties on crosswind stability of vehicles   |                      |
| <u>Carsten Proppe</u> , Xiaoyu Zhang  |                      |
| <b>ThuMor 2</b>   | <b>09:40 - 10:20</b> |
| Dynamical analysis of autonomous underwater vehicles with design uncertainties: A multibody system approach |                      |
| <u>Shuxin Wang</u> , Baiyan He, Zhiliang Wu   |                      |
| <b>ThuMor 3</b>   | <b>10:20 - 11:00</b> |
| Effect of defects distribution on fatigue life of wind turbine main shaft                                   |                      |
| <u>Hesam Mirzaei Rafsanjani</u> , John D. Sørensen, Krishnendu Mukherjee, Søren Fæster                      |                      |
| <b>ThuMor 4</b>   | <b>11:30 - 12:10</b> |
| Sensitivity computation for uncertain dynamical systems using high-dimensional model representation         |                      |
| <u>Nico-Philipp Walz</u> , Markus Burkhardt, Michael Hanss, Peter Eberhard                                  |                      |
| <b>ThuMor 5</b>   | <b>12:10 - 12:50</b> |
| Multibody simulation of planetary rover mobility in condition of uncertain soft terrain                     |                      |
| <u>Alberto Gallina</u> , Andreas Gibbesch, Rainer Krenn, Tadeusz Uhl, Bernd Schäfer                         |                      |

## Friday, June 13, 2014

|  |                      |
|--|----------------------|
| <b>FriMor 1</b>  | <b>09:00 - 09:40</b> |
| Hydrogen as an indicator of high-cycle fatigue                         |                      |
| Alexander K. Belyaev, <u>Vladimir A. Polyanskiy</u> , Yuri A. Yakovlev |                      |
| <b>FriMor 2</b>  | <b>09:40 - 10:20</b> |
| Human induced excitation on pedestrian bridges                         |                      |
| <u>Fabio Casciati</u> , Sara Casciati, Lucia Faravelli                 |                      |
| <b>FriMor 3</b>  | <b>10:20 - 11:00</b> |
| A note on design uncertainties in self-excited vibrations              |                      |
| <u>Peter Hagedorn</u> , Manuel Eckstein, Eduard Heffel                 |                      |
| <b>FriMor 4</b>  | <b>11:30 - 12:10</b> |
| Uncertainties in road vehicle suspensions                              |                      |
| <u>Werner Schiehlen</u>  |                      |

## Imprint

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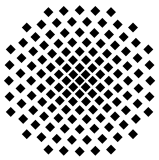
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