Location
University of Technology Vienna, Institute of Mechanics and Mechatronics, Wiedner Hauptstrasse 8 – 10, 1040 Vienna, Austria
A list of nearby accommodations, a description of the location and hints for travel will be mailed to the participants upon registration. Please make your own hotel accommodation.

Fee
EUR 1.090.--
Please pay by non-cash means after receiving the invoice.
CCG is a non profit organization, exempt from value-added tax in Germany.
Members of CCG receive a 10% discount and students a 75% discount when they present their student card. If several employees of a company/department register for the same seminar, each receives a 10% discount. The discounts cannot be combined.

Registration
Please write or call (up to 14 days before the seminar) to
Carl-Cranz-Gesellschaft e.V.; P.O. Box 11 12, D-82230 Wessling
Tel. +49 (0) 8153 / 88 11 98 -12, Fax -19, E-Mail: anmelden@ccg-ev.de
Internet: www.ccg-ev.de
After receipt of registration, a confirmation letter will be sent.

Further Information
For more information about our organization please do not hesitate to contact the CCG at Oberpfaffenhofen at the phone number given above.
For more information on the content of the seminar please contact
Prof. Dr. Manfred Plöchl
Vienna University of Technology, Institute of Mechanics and Mechatronics, Wiedner Hauptstrasse 8 – 10, 1040 Vienna, Austria
Tel. +43 (0) 1 / 58801-325-125 E-Mail: m.ploechl@tuwien.ac.at

Substitutions and Cancellations
Substitutions may be made at any time. Cancellation of an accepted registration made up to 7 days prior to the start of the seminar is subject to a EUR 25.-- administrative fee. Participants canceling after that date are responsible for the entire seminar fee. CCG reserves the right to cancel a course up to 10 days before the course’s beginning in case of low number of participants or for other significant reasons. Furthermore, CCG reserves the right, against the announcement in the programme, to possibly replace at short notice a lecturer and also the lecturer’s topic. Any claims for damages shall be excluded.

Who Should Attend
Scientists, researchers and engineers of industry and academic institutions and doctoral and diploma students that are interested in tire modeling or need to use tire characteristics for their investigations.

Focus
Four of the today best known and commercially applied tire characteristics approximations (TMeasy, FTire, SWIFT, RMOD-K) will be presented by their original authors: theoretical background, parameterization and adaptation based on measurements and corresponding software presentations.
By the acquired knowledge the participants should be able to evaluate the efficient application of the tire models. Moreover detailed information about tire characteristics could be very helpful for the interpretation of vehicle dynamics simulation results.

Language
English

Course Book
Each attendant will be provided with detailed course material in English.
# Seminar Outline

## Thursday, September 6, 2012

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Lecturers</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>08.45 – 09.00</td>
<td>Welcome</td>
<td>M. Plöchl</td>
<td>Welcome and organization</td>
</tr>
<tr>
<td>09.00 – 10.30</td>
<td>TMeasy</td>
<td>W. Hirschberg, G. Rill</td>
<td>TMeasy: A semi-physical tire model for vehicle dynamics and handling analyses • Overall concept of TMeasy, range of application • Modeling concept • Contact geometry • Overall concept • Wheel load and tipping torque • Generalized tire force • Self aligning and turn torque</td>
</tr>
<tr>
<td>11.00 – 12.30</td>
<td>First order tire dynamics</td>
<td>G. Rill, W. Hirschberg</td>
<td>First order tire dynamics • How to apply TMeasy • Estimation of the TMeasy parameters • Uncertainty of measurement data • User roads • Examples of application</td>
</tr>
<tr>
<td>13.30 – 15.00</td>
<td>FTire</td>
<td>M. Gipser</td>
<td>FTire: a physically based tire model for handling, ride, NVH, mobility, and durability • Range of application • Modelization and model data • Numerics and implementation aspects • Operating conditions • Model extensions: thermal model, tread wear, flexible/viscoplastic rim, air cavity • Road model interfacing • RGR roads and soft soil modeling • Availability of FTire in commercial MBS software packages • Validation examples</td>
</tr>
<tr>
<td>15.30 – 17.00</td>
<td>Tools for FTire</td>
<td>M. Gipser</td>
<td>Tools for FTire: FTire/fit (parameter fit on basis of time-domain measurements, including cleat tests) • FTire/calc (parameter computation based upon tire design data) • Fast static and steady-state analysis • Modal analysis of unloaded and loaded tire • Linearization • Demonstration of FTire and its tools</td>
</tr>
</tbody>
</table>

## Friday, September 7, 2012

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Lecturers</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>09.00 – 10.30</td>
<td>Different approaches in tyre modelling</td>
<td>A. Schmeitz</td>
<td>Different approaches in tyre modelling • The Magic Formula steady-state force and moment model • Tyre dynamics up to 60-100 Hz • Short wavelength obstacle enveloping • Model validation • Recent developments</td>
</tr>
<tr>
<td>11.00 – 12.30</td>
<td>Measurements and parameter identification</td>
<td>A. Schmeitz</td>
<td>Measurements and parameter identification • Demonstration of MF-Tool 6.1 • Availability, usage and applications of the MF-Tyre/MF-Swift 6.1 model</td>
</tr>
<tr>
<td>13.30 – 15.00</td>
<td>Tyre modelling and tyre model families with shared parameter sets, basics of tangential contact dynamics, steady state models and parameter optimization, linearization and friction modeling</td>
<td>Ch. Oertel</td>
<td>Tyre modelling and tyre model families with shared parameter sets, basics of tangential contact dynamics, steady state models and parameter optimization, linearization and friction modeling • Eigensystem of contact, numerical aspects of contact dynamics • Applications and extensions (first and second order dynamics) • rigid ring model</td>
</tr>
<tr>
<td>15.30 – 17.00</td>
<td>Extensions to flexible belt models</td>
<td>Ch. Oertel</td>
<td>Extensions to flexible belt models • Principles of modeling flexible structures by FEM or hybrid techniques modeling • RMOD-K FEM and FB model with flexible belt dynamics, contact dynamics and extensions to misuse • Parameter determination in the context of a model family • Applications from steady state behaviour (ALE) to short wavelength transient dynamics</td>
</tr>
</tbody>
</table>

## Lecturers

- M. Gipser, Prof. Dr., Esslingen University of Applied Sciences (D)
- W. Hirschberg, Prof. Dr., Graz University of Technology (A)
- Ch. Oertel, Prof. Dr., Brandenburg University of Applied Sciences (D)
- M. Plöchl, Prof. Dr., Vienna University of Technology (A)
- G. Rill, Prof. Dr., Regensburg University of Applied Science (D)
- A. Schmeitz, Dr., TNO Science and Industry, Helmond (NL)

## Additional Courses

- „Technische Zuverlässigkeit“, 24.–28.9.2012 (Code TV 4.04)
- „Experimentelle Modalanalyse – Grundlagen, Methoden und Anwendungen“, 15.–18.10.2012 (Code TV 1.01)