

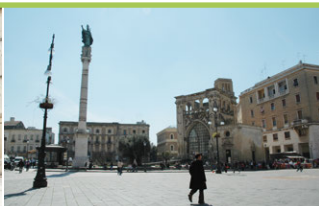


ICCCM 2017

5th International Conference on Computational Contact Mechanics

5-7 July 2017, Lecce - Italy

(Provisional Version V2)



ICCCM 2017

**V International Conference
on Computational Contact Mechanics**

5-7 July 2017 - Lecce, Italy

General Info & Daily Program

(PROVISIONAL)

COMPUTATIONAL CONTACT MECHANICS

Proceedings of the V International Conference on
Computational Contact Mechanics, held in Lecce, Italy

5-7 July 2017

Edited by

Giorgio Zavarise

University of Salento, Italy

Peter Wriggers

Leibniz Universität Hannover, Germany



CONTENTS

- 1. Preface**
 - 2. Patronages & Sponsors**
 - 3. Conference Organizers**
 - 4. International Scientific Committee**
 - 5. Keynote Lecturers**
 - 6. Venue**
 - 7. Conference Information**
 - 8. Events & Locations**
 - 9. Scientific Program**
 - 10. Social Program**
 - 11. Museo Faggiano – A Jewel in the Old Town**
-

PREFACE

In the last years, Computational Contact Mechanics has been a topic of broad interest and very intense research. The main effort has been devoted to the development of robust solution schemes and new discretization techniques, which can be applied to different classes of contact problems.

Previous meetings in the ICCCM series were held in Lecce (2009 and 2013) and Hannover (2011 and 2015). All these meetings have been very successful and, together with the present one, they are becoming an established event in the field.

The aim of the V International Conference on Computational Contact Mechanics is to provide an international forum for researchers, practitioners and for all the scientists who are concerned with modern computational techniques and applications in the field of Contact Mechanics.

The organizers hope that this event will provide a platform for participants to discuss recent advances and identify future research directions in the field.

The Conference program is divided into eleven sessions related to specific topics. Five keynote lectures, presented by internationally recognized researchers in this field, will provide an overview on current research directions.

It is planned to invite authors of selected contributions to submit a full paper after the conference, for inclusion in a special issue of an international journal or in another publication of international relevance.

Lecce, July 2017

The Chairmen of ICCCM 2017

G. Zavarise & P. Wriggers

PATRONAGES & SPONSORS

The conference organizers acknowledge the support towards the organization of the ICCCM 2017 to the following organizations:

 <p>UNIVERSITÀ DEL SALENTO</p> <p>Università del Salento</p>	 <p>European Community on Computational Methods in Applied Sciences</p>	
 <p>Department of Innovation Engineering</p>	 <p>Dipartimento di Matematica e Fisica "Ennio De Giorgi" Department of Mathematics and Physics "Ennio De Giorgi"</p>	
 <p>Leibniz Universität Hannover</p> <p>Leibniz Universität Hannover</p>	 <p>Graduate School MUSOC Multiscale Methods for Interface Coupling</p> <p>Graduate School Multiscale Methods for Interface Coupling</p>	
 <p>Banca Popolare Pugliese</p> <p>Banca Popolare Pugliese</p>	 <p>EnginSoft S.p.A.</p>	
 <p>Puglia Region</p>	 <p>Province of Lecce</p>	 <p>City of Lecce</p>

CONFERENCE ORGANIZERS

Chairmen

Giorgio Zavarise (Chairman)
University of Salento - Department of Innovation Engineering
Edificio “La Stecca”, Via per Monteroni, 73100 Lecce – Italy
Phone: +39 0832 297 275
E-mail: giorgio.zavarise@unisalento.it

Peter Wriggers (Co-Chairman)
Leibniz Universität Hannover - Institute of Continuum Mechanics
Appelstrasse 11, 30167 Hannover - Germany
Phone: +49 511 762 2220
E-mail: wriggers@ikm.uni-hannover.de

Scientific Secretary

Rossana Dimitri
Tel: +39 0832 297 385
E-mail: rossana.dimitri@unisalento.it

Local Organizing Committee

Maria Laura De Bellis E-mail: marialaura.debellis@unisalento.it
Ada Malagnino E-mail: ada.malagnino@unisalento.it
Francesco Paolo Pinnola E-mail: francesco.pinnola@unisalento.it
Marco Trullo E-mail: marco.trullo@unisalento.it

Conference Secretary

Daniela Dell'Anna
Tel: +39 0832 297 414
E-mail: icccm2017@unisalento.it

Website Administrator

Carlo Tafuro
Tel: +39 0832 299 066
E-mail: carlo.tafuro@unisalento.it

INTERNATIONAL SCIENTIFIC COMMITTEE

Pierre Alart	Laboratoire de Mecanique et de Genie Civil CNRS, France
Olivier Allix	École Normale Supérieure de Cachan, France
Andreas Almqvist	Luleå University of Technology, Sweden
Michele Campiti	University of Salento, Italy
Zdenek Dostal	Technical University Ostrava, Czech Republic
Damien Durville	École Centrale Paris, France
Peter Eberhard	Universität Stuttgart, Germany
Rolf Krause	Università della Svizzera Italiana, Switzerland
Tod Laursen	Khalifa University of Science, United Arab Emirates
Przemyslaw Litewka	Poznan University of Technology, Poland
Jaen-Francois Molinari	Ecole Polytechnique Fédérale de Lausanne, Switzerland
Udo Nackenhorst	Leibniz Universität of Hannover, Germany
Eugenio Oñate	Universitat Politècnica de Catalunya, Spain
D. Roger J. Owen	Swansea University, UK
Mike Puso	Lawrence Livermore National Laboratory, USA
Michel Raous	Laboratoire de Mecanique et d'Acoustique CNRS, France
Jerzy Rojek	Polish Academy of Sciences, Poland
Elio Sacco	University of Cassino and Southern Lazio, Italy
Daichao Sheng	University of Newcastle, Australia
George E. Stavroulakis	University of Crete, Greece
Stanislaw Stupkiewicz	Polish Academy of Sciences, Poland
Robert L. Taylor	University of California at Berkeley, USA
Barbara Wohlmuth	Technische Universität München, Germany
Tarek Zohdi	University of California at Berkeley, USA

KEYNOTE LECTURERS



Jakub Lengiewicz

Institute of Fundamental Technological Research of the
Polish Academy of Sciences

Contact model for soft volumetric actuators



Udo Nackenhorst

Institute of mechanics and Computational Mechanics,
Leibniz Universität of Hannover - Hannover, Germany

**stochastic multi-scale contact computations for tire
dynamics simulation**



Marco Paggi

IMT School for Advanced Studies Lucca

**Computational methods for fracture and contact at
interfaces: cohesive zone model, phase field
approach, micromechanics**

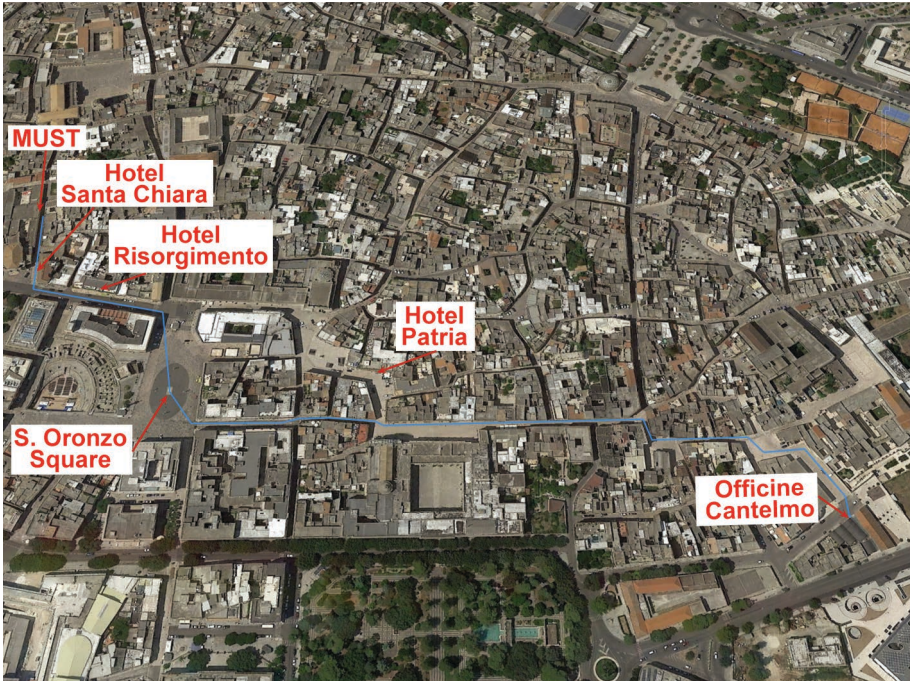


Mathieu Renouf

Université de Montpellier - Montpellier cedex - FRANCE

Numerical modeling of Tribological Interface

VENUE



The conference takes place at the “Officine Cantelmo”, (address: Corte dei Mesagnesi, Lecce)

Capital of the homonymous province and the cultural fulcrum of Salento (Apulia), Lecce is one of the most beautiful art cities in southern Italy. Known as the “Florence of the South,” Lecce knows how to surprise and intrigue visitors and locals alike: its ancient Messapian origins and its archaeological ruins, left behind after Roman domination, fuse with the richness and exuberance of the Baroque churches and palaces (typically from the 1600s).

Lecce and Salento, with the beauty of the historic centers, of the landscapes and the coasts, attract tourists from all over the world

CONFERENCE INFORMATION

Pre-Registration

Conference registration will start on **Tuesday, July 4**, during the **Welcome Reception at MUST** (Historical Museum of the Town of Lecce - Via degli Ammirati 11), between 6.00 – 8.00 p.m.

Registration

You can register on-site and pick up the conference material at the Conference Registration Desk at the Officine Cantelmo Hall on:

Wednesday July, 5 8:30 -18:00

Thursday July, 6 8:30 -18:00

Friday Jul7, 7 8:30 -18:00

The Registration Desk will also serve as Conference Office during the conference

Presentations: Time & Equipment

Each regular presentation is allocated to 20 minutes, including questions.

Each keynote lecture presentation is allocated to 40 minutes, including questions.

If you wish to use your own PC, connection to the projector **must be tested** before the beginning of your session.

WI-FI facilities

The EDUROAM wireless connection is available in the “Officine Cantelmo”. Hence, Eduroam users will have direct access, while a password will be provided for all the other participants.

Coffees & Lunches

A coffee break area will be available at the conference venue.

A lunch buffet is also offered to the participants.

EVENTS & LOCATIONS

TUESDAY, JULY 4

- **18:00 - 20:00 - Pre-registration & welcome cocktail**

The event will take place at MUST - Historical Museum of the Town of Lecce, Via degli Ammirati 11.

WEDNESDAY, JULY 5

- **8:00 – 9:20 - Registration & opening**

The event will take place at the Conference location: Officine Cantelmo, (address: Corte dei Mesagnesi, Lecce)

- **17:40 - Guided tour of the town**

THURSDAY, JULY, 6

- **16:40 - Tour to Gallipoli**
- **19:50 - Cocktail & Conference Dinner**

Masseria Pizzofalcone - SS 476 Cutrofiano-Supersano, 73040 Supersano (LE)

FRIDAY, JULY 7

- **14:40 - Conference Closure**

SCIENTIFIC PROGRAM

Wednesday, 5 July		
8:00	Registration	
9:00	Opening	
9:20	Keynote 1	
	U. Nackenhorst	Stochastic Multi-Scale Contact Computations for Rolling Tire Simulations
10:00	Session 1	
	10:00 T.A. Palanichamy, U. Nackenhorst, A. Suwannachit	A novel approach for rolling contact simulations using coupled ALE-Lagrangian framework
	10:20 C. Curreli, L. Mattei, F. Di Puccio	Computational aspects in three-dimensional Finite Element simulations of pin-on-disc wear test using submodeling
	10:40 R. Schouwenaars, M. Á. Ramírez, V.H. Jacobo, A. Ortiz	Statistical simulation of the effect of fractal dimension and resolution of randomly rough surfaces used in asperity-based contact models
11:00	Coffee break	
11:20	Session 2	
	11:20 M. Fortin	Frictional contact : 1-numerical approximation and algorithms
	11:40 T. Diop, M. Fortin, J. Deteix	Frictional contact : 2-numerical results
	12:00 G. Wautelet	On some Improvements of the Augmented Lagrangian Treatment for Solving Frictional Contact Problems
	12:20 B.R. Akula, J. Vignollet, V.A. Yastrebov	Frictional Contact and Wear Along Virtual Interfaces: Coupling the Mortar Method with the X-FEM
	12.40 R. Mlika,	An unbiased Nitsche's formulation of large

		Y. Renard, F. Chouly	deformation frictional contact and self-contact
13:00		A. Popp, C. Meier, M. Oshima	Novel contact algorithms for nonlinear beam models – Beam-to-beam contact, beam-to-solid mesh tying and beam-to-solid contact
13:20	Lunch		
14:20	Keynote 2		
		J. Stanislaw Lengiewicz	Contact model for soft volumetric actuators
15:00	Session 3		
15:00		T.N. Baranger, S. Andrieux	Identification solutions with contact problems via the solution of the Cauchy Problem
15:20		T.X. Duong, L. De Lorenzis, R. Sauer	An extended isogeometric mortar contact method
15:40		P. Antolin, A. Buffa, M. Fabre,	A mixed formulation for large deformation contact problem using IsoGeometric Analysis
16:00		M.A. Puso	Coupling Lagrangian and ALE Finite Element Meshes with Contact
16:20	Coffee break		
16:40	Session 4		
16:40		A. Leichner	Numerical Solution of Contact Problems in Cartesian Grids using Level Set Functions
17:00		A. Gay Neto, P.de M. Pimenta, P. Wriggers	Master-slave contact formulation accounting for rotation of slave points
17:20		P.R.R. de Campos, A. Gay Neto	Master-surface to master-surface contact formulation applied to rigid-flexible multibody systems
17:40	Guided tour of the town (about two hours)		

Thursday, 6 July

9:00 Keynote 3

	M. Paggi	Computational methods for fracture and contact at interfaces: cohesive zone model, phase field approach, micromechanics
--	-----------------	--

9:40 Session 5

9:40	<u>G. Costagliola</u> , L. Brely, F. Bosia, N.M. Pugno	Adhesion of hierarchical surfaces
10:00	<u>G. Borino</u> , F. Parrinello	A cohesive interface formulation in large displacements
10:20	<u>E. Sacco</u>	A 3D multiplane cohesive interface model combining damage, friction and interlocking
10:40	<u>D. Neusius</u>	Computational truss model for large knitted structures of hyperelastic strings with Coulomb friction and adhesion

11:00 Coffee break

11:20 Session 6

11:20	<u>M.A. Chaudry</u> , C. Weißenfels, A. Düster, P. Wriggers	Computational modelling of granular materials during confined compression
11:40	<u>G.E. Stavroulakis</u> , G.A. Drosopoulos	Multi-scale homogenization for masonry structures
12:00	M.J. Lewandowski	Micromechanical contact model for Cosserat continuum
12:20	R. Simonart, M.C. Salvadori, T.J. Massart, <u>P.Z. Berke</u>	Coupled experimental-computational investigation of PMMA-Au nanocomposite by Atomic Force Microscopy
12:40	<u>R. Dimitri</u> , G. Zavarise	An innovative treatment of frictional contact and mixed-mode debonding problems based on IGA

	13:00	<u>V.L. Popov</u> , R. Pohrt, Q. Li	Adhesive Contacts: Boundary Element Simulations and Experiment
13:20	Lunch		
14:20	Session 7		
	14:20	<u>P. Cinat</u> , M. Paggi, C. Borri	Surface roughness genomics
	14:40	<u>E. Milanese</u> , R. Aghababaei, J.F. Molinari	The role of hardness in the surface roughness evolution during adhesive wear processes
	15:00	<u>C.G. von Planta</u>	A Parallel Semigeometric Monotone Multigrid Method for Contact in Rough Rock Surfaces
	15:20	<u>R.L. Gates</u> , U. Nackenhorst	Rough surface contact: improved efficiency and robustness through the incorporation of multi-freedom constraints
	15:40	<u>J. Rojek</u> , D. Lumelskyj, S. Nosewicz, B. Romelczyk	An elastoplastic contact model for spherical discrete elements
16:00	Coffee break		
16:40	Bus departure from Lecce: Visiting tour to Gallipoli		
19:50	Bus departure from Gallipoli: Conference dinner at “Masseria Pizzofalcone” – Supersano		

Friday, 7 July		
9:00	Keynote 4	
	M. Renouf	Numerical modeling of Tribological Interface
9:40	Session 8	
	9:40	<u>F. Perez Rafols</u> On the contact between elasto-plastic layered solids with rough interfaces
	10:00	<u>A. Seitz, C. Ager, W.A. Wall, A. Popp</u> Nitsche's method for finite deformation elasto-plastic contact
	10:20	<u>T. Sluzalec</u> A Signorini contact problem in rigid-viscoplasticity
	10:40	<u>Z. Dostal, O. Vlach</u> Scalable TFETI based domain decoposition for contact problems with variationally consistent discretization of non-penetration
11:00	Coffee break	
11:20	Session 9	
	11:20	<u>L. Kazaz</u> Modelling Fluid-Solid Contact using Elastic Multibody Systems and Meshfree Fluid Descriptions
	11:40	<u>A.G. Shvarts, V.A. Yastrebov</u> A strong coupling scheme for the thin fluid flow through the contact interface between wavy surfaces
	12:00	<u>J. Sohn, C. Jun</u> Comparison of contact analysis between a rigid body and fluid with experiment
	12:20	<u>P.A. Trapper</u> Pipeline - soil interaction for pipe-lay on a seabed with nonlinear stiffness
	12:40	<u>I.S. Trubchik, L. Evich, E. Ladoshia</u> Modeling the effect of alternating gradient elastic properties of the thin coating of a rigid foundation on the stress state near the contact region coating with non-deformable stamp
	13:00	<u>Z. Zhang</u> Numerical studies on mechanism of tool self-optimization in friction stir welding
13:20	Lunch	

14:20	Session 10	
14:20	<u>S. Parayil Venugopalan,</u> <u>L. Nicola</u>	Contact deformation of self-affine metal surfaces: A Green's function dislocation dynamics approach
14:40	<u>P.T. Zwierczyk</u>	Complex FE analysis of a railway wheel-rail connection
15:00	<u>L. Morancay</u>	A comparative study of contact formulations for Crash simulation
15:20	<u>D. Horak</u>	Projector-less TFETI for contact problems implemented in the PERMON toolbox
15:40	<u>M. Jureczka</u>	Numerical treatment of contact problems with thermal effect
16:00	<u>A.A. Nada</u>	Effect of Sliding Velocity on Gear's Contact Based on Non-Holonomic Lagrange Multipliers
16:20	<u>V. Skuric</u>	Lubricated Contact Model for Metal Forming Processes in OpenFOAM
16:40	Conference closure	
16:50	Coffee break	

SOCIAL PROGRAM

Guided tour of the historical center of Lecce Wednesday, July 5, 17:40

The participants will be divided in small groups, each one with a touristic guide, for a short visit of the most important monuments within the historical center. The tour will last about two hours



Puglia is fast becoming Italy's hot new destination, and the seductive capital of the Salento region, Lecce, is able to fascinate any visitor. The town, after early influences by the Greeks, Romans and Normans, is one of Italy's most perfectly preserved Baroque gems, unchanged since the 16th/17th centuries.

It's still quite undiscovered – there are no queues for museums or churches, nor masses of tourists jamming the city's narrow cobbled streets. The cuisine – hearty "cucina povera" ("peasant's food") – is a revelation with simple, fresh recipes that are influencing young chefs in chic bistros in London and Paris. And don't expect Lecce to be a typical sleepy southern town – after dark, with a big student population, the city buzzes until well after midnight.

Guided tour to Gallipoli Thursday, July, 6 – Bus departure from Lecce at 16:40

Gallipoli is a fishing village on the coast in southern Italy's Puglia region with an interesting old town built on a limestone island and linked to the mainland by a 16th century bridge. Its harbors are used by fishing boats and there's plenty of fresh seafood. The name Gallipoli comes from the Greek *Kallipolis* meaning beautiful city, as this area was once part of ancient Greece.

The highlight of a visit is Gallipoli's Old Town. It's very picturesque and a nice place to stroll through its maze of alleys. The 17th century Baroque Sant' Agata Cathedral is in the center of the town. Several interesting churches are along the perimeter of the old town facing the sea. The walls and bastions surrounding the old town are believed to have been built in the 15th century to fend off attacks, especially from pirates. The walls were altered in the 19th century permitting beautiful views of the sea, port, and harbors



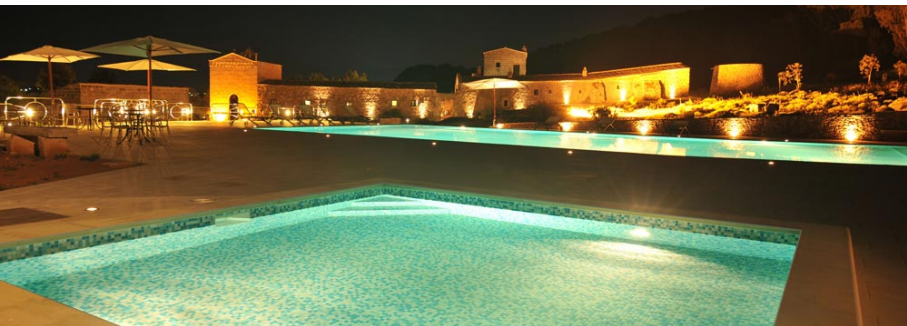
Conference Dinner

Thursday, July 6, - Bus departure from Gallipoli at 19:50

For those who dream of a holiday in the countryside of Salento, a place strewn with ancient olives and fragrant citrus trees, on farms edged by dry stone walls with a long history to recount. For those who want total relaxation, far from noise. For those who love the aromas of herbs, the flavours of the Mediterranean, and walks in the open air.

There's a place in the heart of Salento that can offer all of this and far more. At the foot of a gentle hill, it rises from the rocks with a backdrop of woods and looks out over a sweep of olives and citrus trees in front.

NOTE: some rooms will be available for people that wish to change their clothes after their tour in Gallipoli.



MUSEO FAGGIANO - A JEWEL IN THE OLD TOWN

Museo Faggiano is located in the historical center. Everything was born almost by accident in 2001, when the owner was forced to break up the floors in order to change the drainpipe. During these works it began to resurface historical and archaeological sites of great interest, which testify to the presence of ancient events of time. Today the house is a real archaeological site, where you can admire more than 2000 years of history.



Open daily from 9.30 to 13.00 and from 16.00 to 20.00

Via Ascanio Grandi, 56 – Lecce (5 min from S. Oronzo main square)

Conference participants have a free entrance ticket.

