

Curriculum Vitae

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Actual position

Since December **2012** covers the position of **Associate Professor (Professore di II fascia)** at the **DIMA** - Department of Mechanical and Aerospace Engineering of the University of Rome “La Sapienza”, with the **ASN - Abilitazione Scientifica Nazionale** to the role of Full Professor (**Professore I fascia**). Founding member of the research collaborative network **InTriG (International Tribology Group)**. The teaching activity covers the field of the applied mechanics; the research activities are focused on dynamical and tribological issues.

Previous experience

2007 – 2012 position of **Maître de Conférences** at the INSA of Lyon. The teaching service was shared between the mechanical department GMD (**Génie Mécanique Développement**) and the department “Premier Cycle” (1st and 2nd years) of the INSA of Lyon. The research position at the laboratory **LaMCoS – UMR 5259 (Laboratoire de Mécanique des Contacts et des Structures)** of the INSA of Lyon and of the CNRS (Centre National de la Recherche Scientifique). Member of the research group **TMI (Tribologie et Mécanique des Interfaces)**.

2006 – 2007 Research contract at the LaMCoS in the framework of the **European project BEARINGS** (New generation of aeronautical bearings for extreme environmental constraints).

2003 – 2006 Ph.D. thesis « **Dynamic and tribological analysis of brake squeal** » in ‘cotutelle’ between the **LaMCoS (INSA - Lyon)** and the **DMA (Department of Mechanics and Aeronautics)** of the University of Rome ‘**La Sapienza**’, under the supervision of Pr. L. BAILLET and Pr. A. SESTIERI, defended the 5th of December 2006.

2003 (5 month) Master thesis at the Vibrations and Acoustics Laboratory of the **Carnegie Mellon University - CMU** of Pittsburgh (PN), **USA**, under the supervision of Pr. A. AKAY and Pr. A. SESTIERI. Title: « Studio del fenomeno dello “squeal” dei freni a disco tramite sperimentazione su un freno da laboratorio ».

Diplômes

2006 Ph.D. in ‘Génie Mécanique’, INSA of Lyon / Ecole Doctorale MEGA (co-tutelle)

2006 Ph.D. in ‘Meccanica Teorica ed Applicata’, University of Rome ‘La Sapienza’ (co-tutelle)

2003 Bachelor degree in Mechanical Engineering, University of Rome ‘La Sapienza’, 110/110 with lode

Main research interests (dynamics, tribology, biomechanics, ...)

Coupling system dynamics and local contact behavior

To transfer, dissipate or store energy, mechanical systems include interface in frictional contact. Induced vibrations of components in contact results in large oscillations of the local contact stresses, due to the local deformation of the components at the contact interfaces. Vice-versa the local contact behavior affects the system dynamics. An interdisciplinary approach is needed to handle dynamic and tribological problems.

Brake Squeal Noise and Vibrations

Between the NVH issues, brake squeal is an acoustic emission caused by vibration induced by friction forces, occurring on the frequency range between 1 and 20 KHz. The research project approaches the problem coupling tribological and dynamic analyses, by experimental and numerical investigations. Effects of system parameters such as damping, and passive solutions such as structural modifications are investigated.

Hip endoprosthesis Squeaking noise emission

The ceramic-on-ceramic bearings are characterized by low wear rates and an excellent biocompatibility. Nevertheless, recent worrisome rates of squeaking noise occurrence are reported for this kind of prosthesis. The aim of this project is the development and validation of a numerical model able to predict the friction induced vibrations at the origin of the squeaking noise emission. The model allows as well for recovering the same in-vivo squeaking frequencies and for comparing squeaking propensity of different prosthesis designs.

Tactile perception

Fingers are moved to scan the object surfaces generating skin vibrations. The information on object surfaces is partially contained in the friction induced vibrations. The mechanoreceptors, mechanical sensors immersed into the skin, have the key role of transducing the stress state oscillations into electrical impulses conveyed to the brain. Investigations are developed to link the vibration spectra generated by the finger scanning with the tactile sense.

Wave propagation at contact interfaces

Friction is a stiff phenomenon, depending on several parameters and affecting system behavior. At the frictional contact the relative motion gives rise to local ruptures and waves which propagate at the interface. An understanding of wave propagation and generation at the contact is fundamental for understanding friction induced vibrations and the macroscopic frictional behaviors (local and macroscopic stick-slip, continuous sliding, ...) at the origin of several phenomena such as earthquakes or surface machining damages.

Maps of contact instability scenarios

Phenomena arising when two bodies are in frictional contact like stick-slip, fatigue failures, self-excited vibrations, are substantial subjects of interest in different domains, such as nonlinear dynamics, tribology, biomechanics, or geophysics. The aim of this project is to investigate the instability scenarios occurring when friction forces excite the mechanical systems during the relative motion; the coupling between the local behavior at the contact and the global dynamic of the system brings to either stick-slip phenomena, or modal instabilities.

Energy transfer between acoustic fields by frictional contacts for passive structural monitoring

The friction nonlinearity between sliding surfaces can be used to transfer vibrational energy between acoustic fields, by the dynamic response of the solids in contact. The energy transfer can be useful for several applications such as passive health monitoring and diagnostic, recovering of environmental vibrational energy, ... Numerical and experimental analyses are used to develop systems able to transfer energy between wished acoustic fields.

Analysis of degradation scenarios of high loaded oscillating bearings

This project addresses the analysis of the degradation mechanism of oscillating ball bearings subjected to high loads. These bearings can reach extreme contact pressures at the ball-race contact surfaces; the oscillation of the bearings provides fatigue loading of the contact area due to the repetitive rotation of the balls between the races. A numerical plastic model with contact nonlinearities and experimental tribological observations are developed to highlight the degradation scenarios and to prevent/predict the bearing failure.

False Brinelling degradation of bearings exposed to vibrational environment

This project deals with the numerical analysis aimed to reproduce the behavior of the local contact stresses between balls and races of the rolling bearings mounted on aircrafts. The scenario of the false Brinelling degradation of the race surfaces is investigated. A multi-body nonlinear model is developed to account for the vibrational excitation from the engines and the dynamic response of the bleed valve. The forces acting on the bearings are then introduced in a finite element model, in order to recover the stress distribution at the contact. The stress values at the nucleation zones of the false Brinelling degradation are recovered numerically and validated experimentally.

Energy balance of a frictional contact: contact damping and friction induced vibrations

One of the research branches the most investigated lies in the field of non-linear dynamics and deals with the vibration damping by frictional contact. A more general approach accounting for the energy transfer between surface and solid dynamics is needed to identify the energy effectively dissipated at the contact and the energy reintroduced in the system by friction induced vibrations. To allow this distinction, a main attention is addressed to the energy balance and a correct analysis of the energy flows between bulk and surface.

Contact stiffness

Experimental techniques are developed in order to characterize one of the most unknown parameters in contact mechanics, i.e. the contact stiffness between frictional interfaces.

Hip endoprosthesis stability; Vibrations in bio-mechanics and bio-tribology; ...

International Journals

- [1] Lazzari A., Tonazzi D., Massi F., *Squeal propensity characterization of brake lining materials through friction noise measurements*, **Mechanical Systems and Signal Processing**, Vol.128, pp 216-228, 2019.
- [2] Tonazzi D., Massi F., Salipante M., Baillet L., Berthier Y., *Estimation of the Normal Contact Stiffness for Frictional Interface in Sticking and Sliding Conditions*. **Lubricants**, Vol. 7, 2019.
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- [5] Lazzari A., Tonazzi D., Conidi G., Malmassari C., Cerutti A., Massi F., *Experimental Evaluation of Brake Pad Material Propensity to Stick-Slip and Groan Noise Emission*. **Lubricants**, Vol. 6, 107, 2018.
- [6] Ghezzi I., E. W. Houara Komba, D. Tonazzi, N. Bouscharain, G. Le Jeune, J.B. Coudert, F. Massi, *Damage evolution and contact surfaces analysis of high-loaded oscillating hybrid bearings*, **Wear**, Volumes 406–407, Pages 1-12, 2018.
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- [8] Cesini, I., Ndengue, J.D., Chatelet, E., Faucheu, J., Massi, F., *Correlation between friction-induced vibrations and tactile perception during exploration tasks of isotropic and periodic textures*, **Tribology International**, vol. 120, pp. 330-339, 2018. DOI: 10.1016/j.triboint.2017.12.041.
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- [12] Di Bartolomeo M., Giovanna L., Baillet L., Eric C., Massi F, *Parametrical experimental and numerical analysis on friction-induced vibrations by a simple frictional system*, **Tribology International**, Vol. 112, Pages 47–57, 2017. Doi: 10.1016/j.triboint.2017.03.032
- [13] Dacleu Ndengue J., Cesini I., Faucheu J., Chatelet E., Zahouani H., Delafosse D., Massi F., *Tactile perception and friction induced vibrations: discrimination of similarly patterned wood-like surfaces*, **IEEE Transactions on Haptics**, Vol. 10 , Issue 3, pp 409-4017, 2017. doi: 10.1109/TOH.2016.2643662
- [14] Chehami L., Moulin E., De Rosny J., Prada C., E Chatelet E., Lacerra G., Gryllias K., Massi F., *Nonlinear secondary noise sources for passive defect detection using ultrasound sensors*, **Journal of Sound and Vibration**, Vol. 386, pp. 283-294, 2017. Doi: 10.1016/j.jsv.2016.10.006
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- [25] Tonazzi D., Massi F., Culla A., Baillet L., Fregolent A., Berthier Y., *Instability scenarios between elastic media under frictional contact*, **Mechanical Systems and Signal Processing**, Vol. 40, Issue 2, 2013, pp 754–766, DOI: 10.1016/j.ymssp.2013.05.022 ISSN: 0301-679X
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- [31] Cantone F., Massi F., *A numerical investigation into the squeal instability: Effect of damping*, **Mechanical Systems and Signal Processing**, Vol. 25, Issue 5, Pages 1727-1737, 2011. ISSN: 0888-3270
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- [39] Giannini O., Massi F., *Characterization of the High Frequency Squeal on a Laboratory Brake Set-up*, **Journal of Sound and Vibration**, Vol. 310 (1-2), pp. 394-408, 2008. ISSN: 0022-460X
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- [43] Massi F., Giannini O., Baillet L., *Brake squeal as dynamic instability: an experimental investigation*, **Journal of the Acoustical Society of America**, Vol. 120 (3), pp. 1388-1399, 2006. ISSN: 0001-4966

International Conferences

- [1] Brunetti, J., D'Ambrogio, W., Hoffmann, N., Massi, F., *Investigating the bi-stable behavior of a lumped system with frictional contact*, Proceedings of ISMA 2018 - International Conference on Noise and Vibration Engineering and USD 2018 - International Conference on Uncertainty in Structural Dynamics, pp. 2727-2738, 2018.
- [2] Tonazzi, D., Massi, F., Baillet, L., Salipante, M., Berthier, Y., *Estimation of normal contact stiffness for different contact pairs: Experiments and numerical approach*, Proceedings of ISMA 2018 - International Conference on Noise and Vibration Engineering and USD 2018 - International Conference on Uncertainty in Structural Dynamics, pp. 1851-1862, 2018.
- [3] Lacerra, G., Massi, F., Chatelet, E., Moulin, E., *Acoustic Energy Transfer by Friction Induced Vibrations*, Procedia Engineering, EURO DYN 2017, 199, pp. 1356-1361, 2017.
- [4] J. Dacleu Ndengue, J. Faucheu, H. Zahouani, F. Massi, D. Delafosse, *Perception of textured materials: Does familiarity affects tactile, visual and visuo-tactile discrimination?*, EUROSENSE2016, Dijon, France, September 2016.
- [5] E. Houara Komba, F. Massi, N. Bouscharain, G. Le Jeune, Y. Berthier, Y. Maheo, *Damage analysis in high loaded oscillating bearings*, 71st STLE Annual Meeting & Exhibition, Las Vegas, Nevada (USA), May 15-19, 2016.
- [6] F. Massi, D. Tonazzi, Y. Berthier, *Continuous approach for the experimental estimation of surface contact stiffness*, 71st STLE Annual Meeting & Exhibition, Las Vegas, Nevada (USA), May 15-19, 2016.
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- [11] D. Tonazzi, F. Massi, Y. Berthier, *Estimation of surface contact stiffness using experimental dynamic tests and continuous numerical approach*, EUROBRAKE 2016, Milan, Italy, 13-15 June, 2016.
- [12] C. Malmassari, A. Cerutti, J. Brunetti, W. D'Ambrogio, F. Massi, *Energy Balance criteria for improved CEA - A case study analysis*, SAE Brake Colloquium & Exhibition, 34th Annual, Scottsdale, Arizona, USA, September, 2016.

- [13] Moulin E., Chehami L., Assaad J., de Rosny J., Prada C., Chatelet E., Giovanna L., Gryllias K., Massi F., *Passive defect detection in plate from nonlinear conversion of low-frequency vibrational noise*, Journal of the Acoustical Society of America, vol. 140, issue 4, pp. 3002-3002, 2016. Doi: 10.1121/1.4969308
- [14] G. Lacerra, F. Massi, E. Chatelet, K. Gryllias, *Design of a mechanical system for energy transfer between acoustic fields by frictional contact nonlinearities*, DINAME 2015 - Proceedings of the XVII International Symposium on Dynamic Problems of Mechanics, Natal, Brazil, February 22-27, 2015. ISSN 2316-9567
- [15] F. Massi, D. Tonazzi, M. Di Bartolomeo, L. Baillet, Y. Berthier, *Coupling between system and contact dynamics at the origin of frictional contact scenarios and instability maps*, Friction Forum, Berlin, Germany, 22-23 June, 2015.
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- [36] Di Bartolomeo M., Massi F., Baillet L., Culla A., Fregolent A., *Wave generation and propagation at frictional bimaterial sliding interfaces*, ISMA2012 – International Conference on Noise and Vibration Engineering, Leuven, Belgium, September 17-19, 2012.
- [37] Culla A., Tonazzi D., Massi F., Fregolent A., *Response surface model of a brake system to optimize structural modifications for squeal noise suppression*, INTER-NOISE and NOISE-CON Congress and Conference Proceedings, New York, US, August 19-22, 2012.
- [38] Massi F., Fagiani R., Berthier Y., *Fingertip scanning on a surface: friction coefficients and induced vibrations*, EMCBB-2012, Euro-Mediterranean Conference on Bioengineering and Biomaterials, Fez, Morocco, July 4-6, 2012.
- [39] Massi F., Fagiani R., Berthier Y., Sestieri A., *On the Role of Friction Vibrations for Tactile Perception of Periodic and Complex Surfaces*, STLE/ASME International Joint Tribology Conference, Los Angeles, California, October 24-26, 2011.
- [40] Di Bartolomeo M., Massi F., Baillet L., Fregolent A., Berthier Y., Culla A., *Wave propagation during the sliding initiation at the frictional interface*, 38th Leeds-Lyon Symposium on Tribology, Energy and Health, Lyon, France, (6-9 September 2011).
- [41] Fagiani R., Massi F., Berthier Y., Sestieri A., *Experimental and numerical analysis of friction induced vibrations between fingertip and object surfaces for tactile perception*, ICoBT 2011 - The International Conference on BioTribology, London, UK, (18-21 September 2011).
- [42] Fagiani R., Massi F., Chatelet E., Berthier Y., Sestieri A., *On the duplex model for tactile perception*, 38th Leeds-Lyon Symposium on Tribology, Energy and Health, Lyon, France, (6-9 September 2011).
- [43] Massi F., Berthier Y., Akay A., *On the need for new approaches for brake squeal prediction and suppression*, JEF 2010 - 6th European Conference on Braking, Lille, France (24-25 November 2010).
- [44] Massi F., Berthier Y., *Coupling System Dynamics and Contact Behaviour by Numerical Modelling at Different Scales*, STLE/ASME International Joint Tribology Conference, San Francisco, California, October 18-20, 2010. [ISBN: 978-0-7918-4419-9](#)
- [45] Di Bartolomeo M., Massi F., Meziante A., Baillet L., Culla A., *Dynamics of Rupture at Frictional Rough Interfaces During Sliding Initiation*, ESDA2010 - ASME 2010 10th Biennial Conference on Engineering Systems Design and Analysis, Istanbul, Turkey, (12-14 July 2010). [ISBN: 978-0-7918-4916-3](#)
- [46] Fagiani R., Massi F., Chatelet E., Berthier Y., *Dynamic analysis of surface scanning for tactile perception*, ESDA2010 - ASME 2010 10th Biennial Conference on Engineering Systems Design and Analysis, Istanbul, Turkey, (12-14 July 2010). [ISBN: 978-0-7918-4916-3](#)
- [47] Massi F., *Modelling of Tribological Contacts Subjected to External Dynamic Excitation*, GAMM2010-81st annual meeting of the International Association of Applied Mathematics and Mechanics, Karlsruhe, (Germany, 22-26 March 2010).
- [48] Di Bartolomeo M., Massi F., Meziante A., Baillet L. and Culla A., *Dynamics of Rupture at Frictional Bi-material Interfaces*, Proceedings of the ICFD, Seventh International Conference on Flow Dynamics, November 1-3, 2010 Sendai International Center, Japan.
- [49] Fagiani R., Massi F., Chatelet E., Berthier Y., Sestieri A., *Experimental analysis of friction induced vibrations at the finger contact surface*, 36th Leeds-Lyon Symposium on Tribology, Lyon, France, (1-3 September 2009).
- [50] Meziante A., Di Bartolomeo M., Massi F., Baillet L., *Dynamic rupture on a bi-material interface with asperities*, 36th Leeds-Lyon Symposium on Tribology, Lyon, France, (1-3 September 2009).
- [51] Berthier Y., Culla A., Massi F., Rocchi J., *Nonlinear numerical model for predicting charge conditions on rolling bearings submitted to environmental vibrations*, ISMA2008 – International Conference on Noise and Vibration Engineering, Leuven, Belgium (2008). [ISBN: 978-90-73802-86-5](#)

- [52] Massi F., Berthier Y., Baillet L., *Superficial cracks and material detachments due to unstable vibrations of bodies in sliding contact: an application*, 34th Leeds-Lyon Symposium on Tribology, Lyon, France, (4-7 September 2007).
- [53] Massi F., Giannini O., *Effect of damping on brake squeal noise*, The 36th International Congress and Exhibition on Noise Control Engineering, Istanbul, Turkey (28-31 August 2007). ISBN: 9781605603858
- [54] Massi F., Santoro F., *Structural modifications for squeal noise reduction*, The 36th International Congress and Exhibition on Noise Control Engineering, Istanbul, Turkey (28-31 August 2007). ISBN: 9781605603858
- [55] Culla A., Massi F., *Introduction of uncertainties on the parametrical analysis for stability prediction*, Third-body flow during a wheel-rail interaction, 1st International Conference on Uncertainty in Structural Dynamics, Sheffield, UK, (11–13 June 2007).
- [56] Massi F., Baillet L., Giannini O., *Squeal prediction on a simplified brake system by complex eigenvalues analysis*, Proc. International Conference on Noise and Vibration Engineering - ISMA2006, Leuven, Belgium (2006). ISBN:978-90-73802-83-4
- [57] Giannini O., Sestieri A., Massi F., Akay A., *Experimental investigation and modeling of brake squeal using simplified test rigs*, 25th Annual Brake Colloquium and Exhibition, Orlando, FL, United States, 7 - 10 October 2007, DOI: 10.4271/2007-01-3963
- [58] Massi F., Baillet L., Sestieri A., *Linear and Nonlinear Numerical Approaches to Brake Squeal Noise*, Proc. of The Fifth International Conference on Engineering Computational Technology - ECT2006, Las Palmas de Gran Canaria, Spain (2006). ISBN: 9781615678204
- [59] Culla A., Massi F., *Moored dock under random waves: a stochastic perturbation and linearization technique*, Proc. of The Thirteenth International Congress on Sound and Vibration - ICSV13, Vienna, Austria (2006). ISBN: 3-95-01554-5-7
- [60] Massi F., Sestieri A., Baillet L., *The effect of modal damping on brake squeal instability*, Proc. of The Thirteenth International Congress on Sound and Vibration - ICSV13, Vienna, Austria (2006). ISBN: 3-95-01554-5-7
- [61] Giannini O., Massi F., *Uncertain finite element model for the brake squeal prediction*, Proc. International Modal Analysis Conference - IMAC-XXIV, St. Louis, Missouri (2006). ISBN: 9781604235029
- [62] Massi F., Baillet L., Giannini O., *Experimental analysis on squeal modal instability*, Proc. International Modal Analysis Conference - IMAC-XXIV, St. Louis, Missouri (2006). ISBN: 9781604235029
- [63] Massi F., Baillet L., *Numerical analysis of squeal instability*, Proc. International Conference on emerging technologies of noise and vibration analysis and control - NOVEM, Saint-Raphaël, France (2005).
- [64] Giannini O., Massi F., Sestieri A., *Characterization of the High Frequency Squeal on the Laboratory Brake Set-up*, Proc. International Modal Analysis Conference - IMAC-XXIII, Orlando, Florida (2005). ISBN: 9781604235012
- [65] Massi F., Giannini O., *Extension of a modal instability theory to real brake systems*, Proc. International Modal Analysis Conference - IMAC-XXIII, Orlando, Florida (2005). ISBN: 9781604235012
- [66] Giannini O., Massi F., *An experimental study on the brake squeal noise*, Proc. ISMA - International Conference on Noise and Vibration Engineering, Leuven, Belgium (2004). ISBN: 90-73802-82-2
- [67] Giannini O., Massi F., and Akay A., *Experimental study of the high frequency squeal on a*, (2004).

National conferences

- [1] J. Dacleu Ndengue, I. Cesini, J. Faucheu, E. Chatelet, H. Zahouani, D. Delafosse, F. Massi, *Sensory Analysis of Tactile Perception and Friction Induced Vibrations for Textured Surfaces*, JIFT 2016 - Journées Internationales Francophones de Tribologie, Saint-Etienne, France, April 2016.
- [2] E. Perrin, B. Bou-Said, F. Massi, *Modèle poroélastique de l'os cortical basé sur la méthode d'homogénéisation*, JSFM, Paris, 28-30 November 2016.
- [3] M.A. Bueno, M. Crest, G. Monteil_ Y. Berthier, B. Lemaire-Semail, F. Massi, A. Vinter, J.M. Aimonetti, L. Carpentier, P.H. Cornuault, F. Giraud, B. Camillieri, E. Ribot-Ciscar, A. Witt, E. Gentaz, S. Mith, *COSTaM : vers la Conception d'Outils pour une Stimulation Tactile Maîtrisée*,

- Handicap 2014 - IFRATH Institut Fédératif de Recherche sur les Aides Techniques pour les personnes Handicapées, Paris, France, Octobre 2014.
- [4] Piriou P., Ouenzerfi G., Henry M., Renault E., Massi F., *Modélisation numérique du phénomène de squeaking des couples céramique-céramique des prothèses de hanche: étude de l'influence du design de la pièce fémorale. Validation in vivo du modèle*, Revue de chirurgie orthopédique et traumatologique (2013), 88e RÉUNION ANNUELLE DE LA SOCIÉTÉ FRANÇAISE DE CHIRURGIE ORTHOPÉDIQUE ET TRAUMATOLOGIQUE, Paris, France 11-14 November 2013.
- [5] Tonazzi D., Di Bartolomeo M., Massi F., Baillet L., Fregolent A., Culla A., Regis E., *Experimental observations of stick-slip instability: discussion and comparison with numerical results on wave and rupture propagation*, XXI Congresso dell'Associazione Italiana di Meccanica Teorica e Applicata, AIMETA, Torino, Italy 17-20 September 2013.
- [6] Brunetti J., Massi F., D'Ambrogio W., Berthier Y., *Numerical investigation on the mode coupling contact dynamic instabilities*, XXI Congresso dell'Associazione Italiana di Meccanica Teorica e Applicata, AIMETA, Torino, Italy 17-20 September 2013.
- [7] Massi F., Berthier Y., Vayssiere C., *Analysis of tribological problems by coupling numerical models at different scales: an application*, XX Congresso dell'Associazione Italiana di Meccanica Teorica e Applicata, Bologna, Italy 12-15 September 2011.
- [8] Di Bartolomeo M., Massi F., Baillet L., Fregolent A., Berthier Y., Culla A., *Sliding initiation at a frictional bimaterial interface*, XX Congresso dell'Associazione Italiana di Meccanica Teorica e Applicata, Bologna, Italy 12-15 September 2011.
- [9] Fagiani R., Massi F., Chatelet E., Berthier Y., Sestieri A., *Design and validation of an experimental set-up for the analysis of friction induced vibrations at the finger contact surface*, XX Congresso dell'Associazione Italiana di Meccanica Teorica e Applicata, Bologna, Italy 12-15 September 2011.
- [10] Massi F., Saulot A., Baillet L., Berthier Y., *'Couplage entre « dynamique du mécanisme » et « dynamique locale du contact associé »*, 20ème Journées Francophones de Tribologie - tribologie et développement durable, Villeurbanne (France), 2008.
- [11] Massi F., Baillet L., Sestieri A., Berthier Y., *'Prédiction des instabilités de crissement générées dans un contact plaquette – disque de frein'*, 20ème Journées Francophones de Tribologie - tribologie et développement durable, Villeurbanne (France), 2008.

Patents

- [1] Patent n° 0001379199, Modifiche strutturali del rotore per riduzione delle emissioni sonore di squeal nei freni a disco, Ministero dello Sviluppo Economico - Ufficio Italiano Brevetti e Marchi, 30/08/2010.

Scientific visibility (awards, scientific distinctions, committees,...)

- [1] **Abilitazione Scientifica Nazionale** alle funzioni di Professore universitario di **Full professor (Professore I fascia)** nel settore concorsuale 09/A2 - Meccanica Applicata Alle Macchine di cui all'articolo 1, del Decreto Direttoriale n. 161 del 28 gennaio 2013.
- [2] **Junior Research Fellow** of the SSAS "Scuola Superiore di Studi Avanzati Sapienza" (2014-2017).
- [3] **PES** (Prime d'Excellence Scientifique), Education and Research Ministry, 2009-2013, France.
- [4] **Invited Panel Speaker** at **EUROBRAKE 2017** strategy panel on "advanced modelling for brake squeal prediction", Dresden, Germany, May 2017.
- [5] **Invited Panel Speaker** at **Asia Brake Conference** at the "Panel on Latest Academic Research", Delhi, India, 2017.
- [6] **Invited Speaker** at the **46th Leeds-Lyon Symposium on Tribology**, September 2019 Lyon.
- [7] Member of the **Editorial Board** of **Mechanics & Industry**-Cambridge Journals (EDP Sciences).
- [8] Member of the **Editorial Board** of **Advances in Mechanical Engineering** (SAGE), 2014-2019.
- [9] **Guest Editor** for **Tribology International** (Ed. Elsevier).
- [10] **Guest Editor** for **Lubricants** (MDPI).
- [11] HIFRATH 2014 Award, obtained for the publication: "COSTaM: vers la Conception d'Outils pour une Stimulation Tactile Maîtrisée", at the Conference HANDICAP 2014, Paris, France (2014).

- [12] Member of the **scientific committee** of the **Labex** (Laboratoire d'excellence) **SISE** (Science & Ingénierie des Surfaces et Interfaces), 2011-2013, France.
- [13] **Track leader** of the track "*Thermal effects in tribology*" at the Tribo-Lyon2013 conference, Lyon, France, (4-6 September 2013).
- [14] **Track leader** of the track "*Tribological issues in the sensitive parts of the human body*" at the 38th Leeds-Lyon Symposium on Tribology, Energy and Health, Lyon, France, (6-9 September 2011).
- [15] **Session chair** at international conferences on dynamics and tribology (ISMA, EUROBRAKE, INTERNOISE, JEF, ACT,...)
- [16] **Co-organization** of the « **GAMM Young Researchers' Minisymposium** » "*Dynamics of mechanical systems with tribological contacts*", at the "GAAM (Society of Applied Mathematics and Mechanics) Annual Meeting 2010", Karlsruhe, Germany.
- [17] **Co-organization** of the « **Friction Induced Vibrations** » special session, at the **ISMA 2014** Conference, Leuven, Belgium.
- [18] Member of **scientific committees and/or organizing committees** of the international congresses **USD2009, Leeds-Lyon 2011, Leeds-Lyon 2013, ACT2014, ECOTRIB2015, ACT2017, EURODYN2017, AIMETA2019, LAC-TC2019....**
- [19] **Panellist** at the '**final panel discussion**' of the session "**Friction-Induced Vibrations**" at the 26th **Brake Colloquium (SAE international)**, San Antonio, Texas **USA**, (2008).
- [20] **D. J. DeMichele Scholarship Award**, obtained for the publication: *Experimental analysis on squeal modal instability*, at the **IMAC XXV**, St Louis, **USA** (2006).
- [21] **Reviewer** for the international journals: **Journal of Sound and Vibrations** (Ed. Elsevier), **Mechanical Systems and Signal Processing** (Ed. Elsevier), **Tribology International** (Ed. Elsevier) ; **Noise Control Engineering Journal** (Ed. INCE/USA); **International Journal of Vehicle Design** (Ed. Inderscience Publishers); **Tribology Letters**, (Ed. Springer), **Wear of Materials**, **Journal of Bionic Engineering** (Ed. Elsevier), **International Journal of Mechanical Sciences** (Ed. Elsevier), **Meccanica** (Ed. Springer), **International Journal of Solids and Structures** (Ed. Elsevier), **Journal of Bionic Engineering** (Ed. Elsevier), **Journal of Engineering Tribology** (Sage), **Mechanism and Machine Theory** (Ed. Elsevier), **Noise Control Engineering Journal** (INCE-USA), **Shock and Vibrations** (Hindawi), **Journal of Vibration and Acoustics** -Transactions of the ASME, ... Reviewer for several International congresses.
- [22] **Member** of the **ATM (Association de TriboMecanique)** society.
- [23] **Board member** of the **AIT (Associazione Italiana di Tribologia)** society.

Scientific and contractual tasks

- **Coordinator** of several research projects between the **DIMA** and **industrial partners** (covered by confidentiality).
- **Partner** in the **EU project AUDACITY**, in the framework of the call **CLEANSKY2**, Horizon 2020 –Framework Programme for Research and Innovation, 2019-....
- **Coordinator** of the **project SAFRAN LANDING SYSTEM – DIMA- LaMCoS** for the tribological and dynamic analysis of aircraft brake CC materials, **2018-**
- **Coordinator** of the **project SOMFY – DIMA- LaMCoS** for the analysis of stick-slip noise from spring brakes, **2018-**
- **Coordinator** of a research project on experimental brake squeal analysis, between the **DIMA** of the University of Rome La Sapienza and **BREMBO S.p.a.**, **2017**
- **Coordinator** of the **project SKF Aerospace – DIMA- LaMCoS** for the analysis of the surface degradations on high loaded oscillating bearings, **2016-**
- **Coordinator** of the Sapienza project **Ateneo 2016** "Analysis of the signals at the origins of tactile perception: friction induced vibrations and contact forces. Towards the understanding and reproduction of touch", **2016-2017**.
- **Coordinator** of a research project on numerical brake squeal prediction, between the **DIMA** of the University of Rome La Sapienza and **BREMBO S.p.a.**, **2015 -2017**.
- **Coordinator** of the Sapienza project **Ateneo 2013** "Energy transfer between different acoustic fields by frictional contact nonlinearities", **2013-2014**.
- **Responsible** of collaboration projects between **Sapienza** and **LaMCoS**: i) on the numerical simulation of ball-race bearing contact; ii) on the simulation of acoustic energy transfer by frictional contact, **2013-2014**.

- **Coordinator LaMCoS** of the **project LaMCoS – TORNIER R&D** for the analysis of the squeaking of hip endoprostheses, **2011-2013**.
- **Coordinator** of the work group 4 "*Secondary passive acoustic source: energy transfer between acoustic fields by sliding contact*" of the **ANR** (Agence nationale de la Recherche) project **PASNI** "*Passive Acoustic Sensing Network and Imaging*".
- **Coordinator** of the **BQR** (Bonus Qualité Recherche) **project** « *Activation tribologique des capteurs sensoriels par les vibrations induites par le contact frottant doigt – surface* », **2008-2010**.
- **Coordinator** of the work group 2 « **GT2** : *Modélisation à l'échelle des premiers corps* » in the framework of the **ANR** project **DiNEET** (*Dialogues Numériques Entre Échelles Tribologiques*), **2009-2011**.
- **Responsible for LaMCoS - INSA** of the **WP2** (Work Package 2: *Modelling and computation to define loads and stresses at mechanisms and contacts levels*) of the European project **BEARINGS** (New generation of aeronautical bearings for extreme environmental constraints), **2007-2009**.
- **Responsible LaMCoS** of the **project LaMCoS - PSA Peugeot-Citroën** for the analysis of the squeal emission on a PSA brake system (Report: MAST 05_CC_043), **2008**.

Administrative tasks

[1] **Member** of the “**Commissione Qualità**” of the “**Consiglio d’Area di Ingegneria Meccanica**”, Sapienza University of Rome, 2017-...

Responsible of the **teaching platform “contact”** of the department “**Génie Mécanique Développement**”, 2009/2010 – 2010/2011– 2011/2012.

[2] **Member** of the "**Conseil des études**" (committee in charge of the organization and evolution of the department didactics), department “**Génie Mécanique Développement**”, 2009-2012.

[3] **Member** of the **Department Board** of the department “**Génie Mécanique Développement**”, 2009/2010 – 2010/2011– 2011/2012.

[4] **Member** of the team for the **international student exchange** at the department “**Génie Mécanique Développement**”, 2009/2010 – 2010/2011– 2011/2012.

[5] **Coordinator** of the on-going professional training courses (Ph.D. and industrials) **Dynamique des systemes mecaniques** (Dynamics of mechanical systems), 2010/2011.

[6] **Responsible** of the **project INSA BQF 2011** (Bonus Qualité Formation) for the development of new experimental platforms for the course "Mesure et Méthode Expérimentale", 2011/2012.

Ph.D. supervising

Co-director of a Ph.D. thesis in ‘cotutelle’ (November 2018 – ...)

‘*Surface vibratory propensity/capacity of C / C materials in the presence of a "3/1" layer*’. (Ph.D. student: Alessandro Lazzari – 2018-..., INSA / ‘La Sapienza’).

Co-director of a Ph.D. thesis (November 2018 – ...)

‘*Physical and numerical tribological simulations of aeronautical oscillating bearings to model their life evolution*’. (Ph.D. student: Lucas Frache – 2018-..., INSA Lyon).

Co-director of a Ph.D. thesis in ‘cotutelle’ (November 2017 – ...)

‘*Study of the vibro-acoustic and tribological behavior of a spring brake for tubular electric motors*’. (Ph.D. student: Ilaria Ghezzi – 2017-..., INSA / ‘La Sapienza’).

Co-director of a Ph.D. thesis in ‘cotutelle’ (November 2017 – ...)

‘*Non-linear interactions between ultrasound acoustic waves and contact interfaces for imaging and characterization of interfaces*’. (Ph.D. student: Dorra Nouira – 2017-..., University of Bordeaux / ‘La Sapienza’).

Co-director of a Ph.D. thesis in ‘cotutelle’ (November 2015 – December 2018)

□ *‘Development of multiscale analysis for hip bon remodeling’*. (Ph.D. student: Eléonore Perrin – 2015-..., INSA / ‘La Sapienza’).

Co-director of a Ph.D. thesis in ‘cotutelle’ (November 2014 – December 2017)

□ *‘Energy and phenomenological analysis of friction induced vibrations: energy transfer between acoustic fields by frictional nonlinearities’*. (Ph.D. student: Giovanna LACERRA – 2014-..., INSA / ‘La Sapienza’).

Co-director of a Ph.D. thesis financed by SKF Aerospace (November 2013 – Mars 2017)

□ *‘Physical, numerical and tribological simulations of oscillating rolling bearings subjected to vibrational fields to increase their lifetime and improve their mounting conditions’*. (Ph.D. student: Eymard HOUARA KOMBA – 2013-2017 INSA).

Co-tutor of a Ph.D. thesis in ‘cotutelle’ (November 2012 – December 2015)

□ *‘Energy balance between frictional contact and material deformation, from surface to solid energy dissipation... towards wear and friction control’*. (Ph.D. student: Jacopo BRUNETTI – 2012-2015, INSA / Univerità degli studi dell’ Aquila).

Co-director of a Ph.D. thesis in ‘cotutelle’ (November 2011 – November 2014)

□ *‘Analysis of the coupling between global and local dynamics at the contact’*. (Ph.D. student: Davide TONAZZI – 2011-2014, INSA / ‘La Sapienza’).

Co-director of a Ph.D. thesis in ‘cotutelle’ (November 2008 – December 2011)

□ *‘Wave generation and propagation at tribological interfaces’*. (Ph.D. student: Mariano DI BARTOLOMEO – 2008-2011, INSA / ‘La Sapienza’). This thesis obtained the support of the **VINCI program of the “Université Franco-Italienne”**.

Co-director of a Ph.D. thesis in ‘cotutelle’ (November 2008 – December 2011)

□ *‘Tribological activation of tactile receptors by vibrations induced at the finger contact surface’*. (Ph.D. student: Ramona FAGIANI – 2008-2011, INSA / ‘La Sapienza’)

PhD Committees

- Guillaume VOUAILLAT, INSA-Lyon, May 2020
- Rabii JAZA, INSA-Lyon, March 2020.
- Edouard DAVIN, CentraleLille, December 2019.
- Hiba JENDOUBI, Université de Poitiers, December 2019.
- Valentin RIPARD, INSA-Lyon, November 2019.
- Kevin PEYRE, University of Mulhouse – Haute Alsace, June 2019.
- Julian ROLLAND, INSA-Lyon, June 2018.
- Eleonore PERRIN, University La Sapienza of Rome/ INSA-Lyon, December 2018.
- Giovanna LACERRA, University La Sapienza of Rome/ INSA-Lyon, December 2017.
- Eymard HOUARA KOMBA, INSA-Lyon, March 2017.
- Abdelkrim SAIDOUN, University of Bordeaux, January 2017.
- Ondiz ZARRAGA, University of Mondragon, December 2016.
- Corentín ROBITAILLE, INSA of Lyon, December 2016.
- Jon ELGUEZABAL, University of Mondragon, June 2016.
- Jacopo BRUNETTI, INSA-Lyon/University of L’Aquila, December 2015.
- Davide TONAZZI, University La Sapienza of Rome/ INSA-Lyon, December 2014.
- Davis NAIDOO RAMASAMI, University of Lille, June 2014.
- Martin DUBOC, University of Lille, November 2013.
- Romain BOCQUET, University of Mulhouse – Haute Alsace, November 2013.
- Ramona FAGIANI, INSA-Lyon/University La Sapienza of Rome, December 2011.
- Mariano DI BARTOLOMEO, University La Sapienza of Rome/INSA-Lyon, December 2011.

PhD Reviews

- Edouard DAVIN, Univ. CentraleLille, December 2019.

- Hiba JENDOUBI, Université de Poitiers, December 2019.
- Valentin RIPARD, INSA-Lyon, November 2019.
- Kevin PEYRE, University of Mulhouse – Haute Alsace, June 2019.
- Julian ROLLAND, INSA-Lyon, June 2018.
- Corentín ROBITAILLE, INSA of Lyon, December 2016.
- Jon ELGUEZABAL, University of Mondragon, June 2016.
- Romain BOCQUET, University of Mulhouse – Haute Alsace, November 2013.

Teaching (2007-2012 INSA of Lyon, 2013-2019 Sapienza of Rome)

2007 – 2008: 251 *eqTD* (71 in English language, 180 in French language)

- **Mécanique Générale** (Kinetics and dynamics of mechanical systems) 2nd year (102h)
- **Recherche et Développement en Tribologie** (Tribology) 5th year (5h)
- **Analyse Numérique des Eléments Finis** (Numerical Analysis and FE methods) 3rd year (20h)
- **Vibrations** (Exercitations in Vibrations) 3rd year (24h)
- **Mesure et Méthode Expérimentale** (Exercitations in measurement) 3rd year (40h)
- **Mathématique** (Introduction to algorithmic and MatLab) 3rd year (16h)
- 3 **Projet de Fin d'Etudes** (Master) 5th year

2008 – 2009: 264h *eqTD* (85 in English language, 179 in French language)

- **Mécanique Générale** (Kinetics and dynamics of mechanical systems) 2nd year (127h)
- **Recherche et Développement en Tribologie** (Tribology) 5th year (7h)
- **Analyse Numérique des Eléments Finis** (Numerical Analysis and FE methods) 3rd year (19h)
- **Mathematical tools for French engineers** (Mathematics) 3rd year (13h)
- **Mesure et Méthode Expérimentale** (Exercitations in measurement) 3rd year (32h)
- **Bases informatiques pour l'ingénieur** (Introduction to algorithmic and MatLab) 3rd year (19h)
- 1 **Projet de Fin d'Etudes** (Master) 5th year
- **Utilisation de logiciels d'éléments finis pour des applications non linéaires : contact, frottement, plasticité** (nonlinear FE methods and applications) master course for Ph.D. and industrials (16h)

2009 – 2010: 240h *eqTD* (82 in English language, 158 in French language)

- **Mécanique Générale** (Kinetics and dynamics of mechanical systems) 2nd year (103h)
- **Recherche et Développement en Tribologie** (Tribology) 5th year (3h)
- **Analyse Numérique des Eléments Finis** (Numerical Analysis and FE methods) 3rd year (16h)
- **Mathematical tools for French engineers** (Mathematics) 3rd year (17h)
- **Mesure et Méthode Expérimentale** (Exercitations in measurement) 3rd year (48h)
- **Bases informatiques pour l'ingénieur** (Introduction to algorithmic and MatLab) 3rd year (15h)
- **Computational Mechanics** – classes for American students (15h)
- 1 **Projet d'Ingénierie** 3th year
- 1 **Projet de Fin d'Etudes** (Master) 5th year

2010 – 2011: 262h *eqTD* (88 in English language, 174 in French language)

- **Mécanique Générale** (Kinetics and dynamics of mechanical systems) 2nd year (99h)
- **Recherche et Développement en Tribologie** (Tribology) 5th year (3h)
- **Analyse Numérique des Eléments Finis** (Numerical Analysis and FE methods) 3rd year (16h)
- **Mathematical tools for French engineers** (Mathematics) 3rd year (15h)
- **Vibrations** (Exercitations in Vibrations) 3rd year (24h)
- **Mesure et Méthode Expérimentale** (Exercitations in measurement) 3rd year (41h)
- **Bases informatiques pour l'ingénieur** (Introduction to algorithmic and MatLab) 3rd year (13h)
- **Computational Mechanics** – classes for American students (22h)
- 1 **Projet d'Ingénierie** 3th year
- 1 **Projet de Fin d'Etudes** (Master) 5th year
- 1 **Master MEGA** (Master) 5th year
- **Dynamique des systèmes mécaniques** (Dynamics of mechanical systems) on-going professional training courses for Ph.D. and industrials (9h)

2011 – 2012: 216h *eqTD* (84 in English language, 132 in French language)

- **Mécanique Générale** (Kinetics and dynamics of mechanical systems) 2nd year (93h)
- **Recherche et Développement en Tribologie** (Tribology) 5th year (3h)
- **Analyse Numérique des Eléments Finis** (Numerical Analysis and FE methods) 3rd year (16h)
- **Mathematical tools for French engineers** (Mathematics) 3rd year (13h)
- **Mesure et Méthode Expérimentale** (Exercitations in measurement) 3rd year (32h)
- **Bases informatiques pour l'ingénieur** (Introduction to algorithmic and MatLab) 3rd year (13h)
- **Computational Mechanics** – classes for American students (22h)

- 1 **Projet d'Ingénierie** 3th year
- 1 **Projet de Fin d'Etudes** (Master ERASMUS) 5th year

2012 – 2013:

- **Meccanica Applicata** (Applied mechanics) for civil engineering. 3th year

2013 – 2014:

- **Meccanica Applicata** (Applied mechanics) for civil engineering. 3th year
- **Meccanica Applicata** (Applied mechanics) for electrotechnical engineering. 3th year
- **Dynamique des systemes mecaniques** (Dynamics of mechanical systems) on-going professional training courses for Ph.D. and industrials, INSAVALOR (Coordinator)

2014 – 2015:

- **Meccanica Applicata** (Applied mechanics) for civil engineering 3th year
- **Meccanica Applicata** (Applied mechanics) for electrotechnical engineering .3th year

2015– 2016:

- **Meccanica Applicata** (Applied mechanics) for civil engineering 3th year
- **Meccanica Applicata** (Applied mechanics) for electrotechnical engineering. 3th year
- **Laboratory characterization of micro-nano mechanical** Laboratory course for nanotechnology engineering. 4th year

2016– 2017:

- **Tribology for Engineers** for mechanical engineering 5th year
- **Meccanica Applicata** (Applied mechanics) for electrotechnical engineering. 3th year
- **Laboratory characterization of micro-nano mechanical** Laboratory course for nanotechnology engineering. 4th year
- **Laboratory on applied mechanics** Laboratory course for energy engineering. 2th year
- **Laboratory on mechanics of vibrations** Laboratory course for energy engineering. 2th year

2017– 2018:

- **Tribology for Engineers** for mechanical engineering 5th year
- **Meccanica Applicata** (Applied mechanics) for electrotechnical engineering. 3th year
- **Laboratory characterization of micro-nano mechanical** Laboratory course for nanotechnology engineering. 4th year
- **Laboratory on applied mechanics** Laboratory course for energy engineering. 2th year
- **Laboratory on mechanics of vibrations** Laboratory course for energy engineering. 2th year

2018– 2019:

- **Tribology for Engineers** for mechanical engineering 5th year
- **Meccanica Applicata** (Applied mechanics) for electrotechnical engineering. 3th year
- **Laboratory on applied mechanics** Laboratory course for energy engineering. 2th year
- **Laboratory on mechanics of vibrations** Laboratory course for energy engineering. 2th year

2019– 2020:

- **Tribology for Engineers** for mechanical engineering 5th year
- **Meccanica Applicata** (Applied mechanics) for electrotechnical engineering. 3th year
- **Laboratory on applied mechanics** Laboratory course for energy engineering. 2th year
- **Laboratory on mechanics of vibrations** Laboratory course for energy engineering. 2th year

Faithfully,

Francesco MASSI



Date: 08/07/2020