Mario Covarrubias

Curriculum Vitae

Contents

Mario Covarrubias

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Mexican citizenship, Italian citizenship in progress

1. Summary

1.1 Education and current position

On 20th February 1996 Mario Covarrubias received the bachelor degree in Mechanical Engineering from Instituto Tecnológico de Pachuca *(México)*. It was not required the thesis, because the final grade was 90.2/100 (Note: the Mechanical Department of the ITP University automatically gives Bachelor Degree qualification if the final grade is equal or grater than 90/100).

On 30th May 2002 Mario Covarrubias received a Master Degree in Manufacturing Systems from *ITESM-Mty (Instituto Tecnologico de Monterrey, Campus Monterrey, México)*, with a thesis entitled "Methodologies for CAD, CAM and CAE analysis for Product Design" ("Metodologie per CAD, CAM and CAE analisis per lo sviluppo prodotto"), Advisor: Prof. Noel Leon Rovira.

He received a Ph.D. with merit in "Virtual Prototypes and Real Products" (Italian name "Disegno e Metodi di Sviluppo Prodotto") from *Politecnico di Milano* on February 24th 2010, with a thesis entitled ''System for aesthetic shapes evaluation based on haptic interface collocated with a stereoscopic visualization system" (Advisor: Prof. Monica Bordegoni).

From August 1st 2013 Mario Covarrubias to January 28 2015 has been Research Fellow (assegnista di ricerca, SSC 09-A3, SSD ING-IND/15) at the Department of Mechanical Engineering, Politecnico di Milano, with a contract on "STUDIO E SVILUPPO PROTOTIPALE DI SISTEMI BASATI SU TECNOLOGIE APTICHE PER LA RIABILITAZIONE MOTORIA" (Analysis, design and prototyping of haptic- based systems for motor rehabilitation).

From 2nd February 2015 is Assistant Professor at the Department of Mechanical Engineering, Politecnico di Milano (Ricercatore RTDB Senior).

1.2 Previous positions

From June 1st 2010 to May 31st 2013 Mario Covarrubias has been Assistant Professor (Ricercatore a tempo determinato, RTDA, SSC 09-A3, SSD ING-IND/15).

From August 2003 to December 2006 Mario Covarrubias has been Full Professor at *ITESM-CCM* University in México City *(Instituto Tecnológico de Monterrey, Campus México City)*. In August 2003 Mario Covarrubias founded the CECCC (CAD, CAM and CAE training center) at ITESM-CCM campus, in México City.

From August 2003 to December 2006 Mario Covarrubias has been the director of the CECCC training center at ITESM-CCM campus, in México City *(Instituto Tecnológico de Monterrey, Campus México City)*.

1.3 Known languages

English (professional working proficiency);
Italian (professional working proficiency);
Spanish (mother tongue).

2. Scientific activities

2.1 Research interests and achievements

Mario Covarrubias's research activity started during the development of his PhD at *Politecnico di Milano*. He joined the KAEMaRT research group (Knowledge Aided Engineering & Manufacturing and Related Technology, http://www.kaemart.it) on January 2007. The group, coordinated by Prof. Umberto Cugini is located in the Department of Mechanical Engineering of the *Politecnico di Milano*. The group's research is focused on tools and methods for product development, and one of the main research areas is the development of methodologies based on the use of virtual prototypes as a support for the product development process. In this area, Mario Covarrubias 's research activity focused on the use of virtual and augmented reality techniques and technologies, and in particular on haptic and multimodal and multisensory technologies, as a support for the product development process. Additionally, Mario Covarrubias started a research line related to the design and assessment of Multimodal Devices for Rehabilitation of upper extremities. In the following sections the main research activities are described in detail.

Multimodal interaction for aesthetic surfaces generation and modification.

Multimodal human interaction with interactive systems is mainly a topic of interest for the research area of Human-Computer Interaction (HCI). The aim is to create new tools, and improving existing ones, which enable humans to interact with computer-generated environments. Neuroscience/psychology are interested in this topic in order to study the way humans perceive and behave when interacting with real and virtual worlds.

Mario Covarrubias's main contribution on this topic is in the use of these techniques in the product development process. In particular, he has investigated how to introduce principles of multimodal interaction, based on vision, touch and hearing in applications of the area of Virtual Prototyping through the design of mechatronic devices. The research activity began with the FP6 – SATIN project (Sound And Tangible Interfaces for Novel product design – www.satin-project.eu) coordinated by Prof. Monica Bordegoni.

In this project Mario Covarrubias coordinated the project activities concerning the development of a haptic device, allowing manual skilled designers to create and modify virtual shapes naturally with their hands, overcoming the limitations of present input devices used with CAS (Computer Aided Styling) tools. The activity focused on the study of the way information should be represented through different sensory modalities, in particular on how to integrate the senses of touch and hearing, and how haptic technology must be developed to match with manual skilled end users requirements. The results of this activity are described in [J4, J6, J7, J8] and [C9, C16-C22]. Additionally, Mario Covarrubias has developed a visualization system which was used in the SATIN Project. The results of this activity are presented in: [J9] and [C23, C24 and C25].

Development of a Methodology that supports Designers in the evaluation and modification of aesthetic shapes through a Desktop Device for Shape Rendering.

Knowledge on the development of multimodal and multisensory environments, studied and elaborated during the EU SATIN project, was applied to another aspect of the product development process: the development of a methodology which supports designers in the evaluation and modification of aesthetic shapes through a Desktop Haptic Device for Shape Rendering. The SATIN system set-up in its entirety is not portable, and because of its relative expensive set of components only one prototype has been built. The main idea of the development of this methodology consists in replicating the concept demonstrated in the SATIN

system by using a desktop and portable haptic device for shape rendering. This methodology includes the advantages of using the associative data to both CAD and multi-body tools and thus maintaining the parametric dependencies between them. In this way, as the parametric data model gets modified according with the designer's needs in the CAD system, the changes are consistently reflected in the multi-body system. Modifications on the virtual shape can be done by using a global approach or by using a CAD drawing, then the data model in the multi-body system is used to render a real 2D cross-section of the aesthetic virtual shape through a Desktop Haptic Device for Shape Rendering, which allows a free-hand interaction with the aesthetic virtual object.

The results of this activity are described in [J2, J3, J5] and [C3-C5, C10, C11, C15].

Development of multimodal systems and methodologies for the Rehabilitation of Upper Extremities.

Knowledge on the development of multimodal and multisensory environments, studied during the EU SATIN project, has been also applied to another interesting research field: The rehabilitation of upper extremities for post-stroke patients.

In order to realize the most performing therapy for post-stroke patients, assistance from therapists is absolutely necessary. Care centers and hospitals must employ specialized personnel (therapists), who are allocated to the rehabilitation of individual patients, in a form of one-to-one. However, it is difficult to provide an every day therapy program due to the medical expenses and because a rehabilitation therapy, which is based on motion-oriented tasks, requires constant presence and time of a therapist. Again, the personnel shortage and costs is a major concern for care centers, which keep personnel limited, to the detriment of patients.

The research activity in this field consists in the use of a multimodal system, mainly based on visual, sound and haptic technologies, in order to allow the patient to perform his/her rehabilitation therapy.

In this research project, Mario Covarrubias has been implemented a Multimodal Guidance System (MGS) whose aim is to provide robotic assistance during the rehabilitation of upper extremities when patients perform 2D and 3D tasks during manual activities such as drawing, coloring and gaming. The MGS consists of a virtual environment including several technologies as haptic, sound and video gaming. The patients are able to feel virtual objects and haptic trajectories, which act as virtual guides taking advantages of its force feedback capabilities. The MGS has been used as an input means for tracking the hand trajectory made by the patient according to the feedback received from 2D and 3D tasks. The performance has been evaluated by comparing the analysis of the tracking results. The MGS has been tested at Rehabilitation Center "Villa Beretta" in Costa Masnaga, Italy.

The results of this activity are described in [J1], [BC1] and [C1, C2, C6-C8, C12-C14, NC1].

Hands-On Demonstrations of the Multimodal system for Upper Rehabilitation.

Mario Covarrubias has been invited to perform several demonstrations of the Multimodal System for upper limb rehabilitation. The demos has been presented in [HD1-HD4]

2.2 Participation in research projects

FP6-IST-5-034525 SATIN (Sound And Tangible Interfaces for Novel product design) coordinator Prof. Monica Bordegoni - http://www.satin-project.eu.

> Mario Covarrubias has participated during the entire project coordinating research and development activities concerning the design and construction of the haptic strip and the visualization system (01.10.2006-30.09.2009), and has contributed to writing the project reports (TR1-TR6).

ABILITY-Telerehabilitation project funded by Regione Lombardia (June 2014 – December 2015)**:** Integrated platform Enabling the Remote Delivery and control of physical and cognitive Rehabilitation, and Self Management.

Mario Covarrubias participates in the ABILITY project coordinating research and development activities concerning the design and construction of low cost devices for rehabilitation. The rehabilitation devices combine haptic, virtual reality and game technologies. An additional research field in the Ability project concerns the design and construction of an Olfactory Display. The rehabilitation devices are connected with a gaming module for cognitive-motor rehabilitation, and integrated with an infrastructure connecting the patient at home with therapists at hospitals who monitor the rehabilitation exercises.

2.3 Review service for journals, international conferences and book series

Mario Covarrubias has been reviewer for the following journals and international conferences:

Journals:

- International Journal of Advanced Robotic Systems, ISSN: 1729-8806, Intech Open Publisher

International conferences:

- ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE) **2012, 2013, 2014**
- ASME World Conference on Innovative Virtual Reality (WINVR) **2010, 2011**
- Eurohaptics **2014**
- IEEE Haptic Symposium **2012, 2014**

Book Series:

- IGI GLOBAL, ISBN13: 9781466624917 **2012**

3. Teaching

3.1 Seminars

Politecnico di Milano – School of Industrial Engineering

2010-2011, 2011-2012, 2012-2013, 2013-2014 seminars of 'CAD Lab' for the B.Sc. Degree in Mechanical Engineering (lecturer: Prof. Umberto Cugini) - **In English**

2007-2008, 2008-2009, 2009-2010 seminars of 'Metodi di Rappresentazione Tecnica' for the B.Sc. Degree in Mechanical Engineering (lecturer: Prof. Umberto Cugini)

2010-2011, 2011-2012, 2012-2013, 2013-2014 seminars of 'Metodi di Rappresentazione Tecnica' for the B.Sc. Degree in Mechanical Engineering (lecturer: Prof. Paolo Bertola)

2013-2014 seminars of 'Metodi di Rappresentazione Tecnica' for the B.Sc. Degree in Mechanical Engineering (lecturer: Prof. Edoardo Rovida)

3.2 Other teaching activities

Mario Covarrubias has been co-supervisor of 2 M.Sc. theses in Mechanical Engineering and Design & Engineering already completed.

Co-Advisor

2013

- Ilaria Ignazzi, "*REHA_BOARD*, *Haptic Device per la riabilitazione dell'arto superiore in pazienti post-stroke*, advisor Prof. Monica Bordegoni, M.Sc. degree in Mechanical Engineering.

2011

- Alessandro Mansutti, "Sviluppo del sistema di movimentazione di un'interfaccia tattile per l'esplorazione di oggetti virtuali", advisor Prof. Monica Bordegoni, M.Sc. degree in Mechanical Engineering.

4 Publications

4.1 Journals

[J1.] **M. Covarrubias**, E. Gatti, M. Bordegoni, U. Cugini, A. Mansutti, *"Improving manual skills in persons with disabilities (PWD) through a multimodal assistance system"*, Disability and Rehabilitation: Assistive Technology. 07/2014; 9(4):335–343. Posted online on May 21, 2013, doi:10.3109/17483107.2013.799238.

[J2.] **M. Covarrubias** and M. Bordegoni, *"Design of a Desktop Haptic System driven by CAD and Multi-body Associativity"*, Computer-Aided Design and Applications, 11(4), 450-458, 2014, DOI:10.1080/16864360.2014.881188

[J3.] **M. Covarrubias** and M. Bordegoni, *"Interaction with virtual aesthetic shapes through a desktop mechatronic system"*, Virtual and Physical Prototyping, 9(1), 27-43, 2014, DOI:10.1080/17452759.2013.866873

[J4.] **M. Covarrubias**, M. Bordegoni and U. Cugini, "Force Sensitive Handles and Capacitive Touch Sensor for Driving a Flexible Haptic-Based Immersive System", Sensors, 13(10), 13487-13508, 2013, doi:10.3390/s131013487

[J5.] **M. Covarrubias**, M. Bordegoni and U. Cugini, *"Continuous Surface Rendering, Passing from CAD to Physical Representation"*, International Journal of Advanced Robotic Systems, ISBN: 1729-8806, 2013, DOI: 10.5772/56536

[J6.] M. Bordegoni, F. Ferrise, **M. Covarrubias**, M. Antolini, "*Geodesic Spline Interface for Haptic Curve Rendering*", IEEE Transactions on Haptics, 4(2), 111-121, March-April 2011, IEEE Computer Society, doi: http://dx.doi.org/10.1109/TOH.2011.1

[J7.] M. Bordegoni, F. Ferrise, **M. Covarrubias**, M. Antolini, "*Haptic and sound interface for shape rendering*", Presence: Teleoperators and Virtual Environments, 19(4), 341-363,The MIT Press, August 2010, doi: http://dx.doi.org/10.1162/PRES_a_00010

[J8.] B. Rodrigues de Araújo, T. Guerreiro, M. J. Fonseca, J. A. Madeiras Pereira, M. Bordegoni, F. Ferrise, **M. Covarrubias**, M. Antolini, "*An Haptic based Immersive Environment for Shape Analysis and Modeling*", Journal of Real-Time Image Processing - JRTIP, 5(2), 73-90, ISSN: 1861-8200, 2010, Springer, doi: http://dx.doi.org/10.1007/s11554-009-0139-8

[J9.] M. Bordegoni, U. Cugini, **M. Covarrubias**, *"Design and assessment of a 3D visualization system integrated with haptic interfaces"*, Special Issue for the International Journal of Design Research (JDR) on the subject "Current Concerns of Industrial Design Engineering Research" Vol. 8, No. 3, 2010, pp 235-251

4.2 Book Chapters

[BC1] **M. Covarrubias**, M. Bordegoni, U. Cugini, E. Gatti, *"Supporting Unskilled People in Manual Tasks through Haptic-Based Guidance"*, Information Systems Research and Exploring Social Artifacts: Approaches and Methodologies. Edited by Pedro Isaias and Miguel Baptista Nunes. Pages: 355-378, 2012, IGI Global. http://www.igi-global.com/book/information-systems-research-exploring-social/68188

4.3 International Conferences

[C1.] ***M. Covarrubias**, M. Bordegoni, U. Cugini, "2D Shape and Force Tracking in Rehabilitation Therapy of Upper Extremities through a Multimodal Guidance System", Proceedings of the ASME 2014 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference. IDETC/CIE 2014, Buffalo, NY, USA, August 2014.*

[C2.] ***M. Covarrubias**, M. Bordegoni, U. Cugini, "Interacting Game and Haptic System Based on Point-Based Approach for Assisting Patients after Stroke", International Conference on Computers Helping People with Special Needs. ICCHP 2014, Saint-Denis; France. July 2014.*

[C3.] *A. Mansutti, **M. Covarrubias**, M. Bordegoni, U. Cugini, "Haptic strip based on modular independent actuators for virtual shapes rendering", Proceedings of the IEEE Haptic Symposium (HAPTICS), Houston, Texas, USA. February 2014.*

[C4.] ***M. Covarrubias**, M. Bordegoni, U. Cugini, "Positioning System for the Interaction with Virtual Shapes through a Desktop Haptic Device.", Proceedings of the ASME 2013 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference. IDETC/CIE 2013, Portland, Oregon, USA, August 2013.*

[C5.] ***M. Covarrubias**, M. Bordegoni, U. Cugini, "Rendering Physical 2D Cross-Sections of Aesthetic Shapes Driven by Equidistant Interpolation Points.", Proceedings of the ASME 2013 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference. IDETC/CIE 2013, Portland, Oregon, USA, August 2013.*

[C6.] ***M. Covarrubias**, M. Bordegoni, U. Cugini, "Servo-Actuated Stylus for Post Stroke Arm and Fore Arm Rehabilitation.", (pp. 1- 5). In: HCI International 2013,Las Vegas, Nevada, USA, July 2013.*

[C7.] ***M. Covarrubias**, M. Bordegoni, U. Cugini, E. Gatti, A. Mansutti, "Pantograph mechanism for increasing the working area in a haptic guidance device for sketching, hatching and cutting tasks", Proceedings of the ASME 2012 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference. IDETC/CIE 2012, Chicago, Illinois, USA, August 2012.*

[C8.] ***M. Covarrubias**, E. Gatti, M. Bordegoni, U. Cugini, A. Mansutti, "Multimodal Guidance system for improving manual skills in disable people", International Conference on Computers Helping People with Special Needs. ICCHP 2012, Linz, Austria. July 2012.*

[C9.] *M. Bordegoni, U. Cugini, F. Ferrise, **M. Covarrubias**, "Haptic interaction with virtual surfaces", 3DCHI The 3rd Dimension of CHI Proceedings, Touching and Designing 3D User Interfaces, 75-78, 2012. ISBN 0416-51898571, Workshop at ACM CHI 2012.*

[C10.] ***M. Covarrubias**, M. Bordegoni, U. Cugini, A. Mansutti, "Kinematic And Workspace Analysis Of A 2-Dof Haptic End-Effector That Carries Out A Developable Haptic Strip", Proceedings of the ASME 2011 International Mechanical Engineering Congress & Exposition. IMECE 2011, Denver, Colorado, USA. November 2011.*

[C11.] ***M. Covarrubias**, M. Bordegoni, U. Cugini, M. Antolini, "Transmission System Improvements In Actuating A Desktop Haptic Strip For Exploration Of Virtual Objects", Proceedings of the ASME 2011 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference. IDETC/CIE 2011, Washington, DC, USA, August 2011.*

[C12.] ***M. Covarrubias**, M. Bordegoni, U. Cugini, "Multifunctional Device For Assisting Unskilled People in Hand Movements Through the Haptic Point-Based Approach", Proceedings of the ASME 2011 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference. IDETC/CIE 2011, Washington, DC, USA, August 2011.*

[C13.] ***M. Covarrubias**, M. Bordegoni, U. Cugini, "Supporting Down People In Cutting Operations Through Haptic Technology", In: IADIS International 2011. Rome, Italy. July 2011.*

[C14.] ***M. Covarrubias**, M. Bordegoni, U. Cugini, "Sketching Haptic System Based on Point-based Approach for Assisting People with Down Syndrome", (pp. 1- 5). In: HCI International 2011. Hilton Orlando Bonnet Creek, Orlando, Florida, USA, July 2011.*

[C15.] ***M. Covarrubias***, *M. Bordegoni, U. Cugini, M. Antolini, "Desktop Haptic Strip for Exploration of Virtual Objects.", (pp. 101- 102). :9781457700620 In: IEEE Symposium on 3D User Interfaces. Singapore, March 2011. [Poster paper]*

[C16.] ***M. Covarrubias***, *M. Antolini, M. Bordegoni, U. Cugini, "TRIZ approach applied to improve and optimize a Haptic Strip device for Exploration and Deformation of Virtual Surfaces", Triz Future Conference 2010 - University of Bergamo, Bergamo - Italy, Novembre 2010.*

[C17.] *M. Antolini,* ***M. Covarrubias***, *M. Bordegoni, U. Cugini, "A framework for managing multiprocess applications based on distributed finite-state machine approach", IEEE Ro-MAN 2010, Principe di Piemonte, Viareggio, Italy, September 2010.*

[C18.] *M. Bordegoni, U. Cugini,* ***M. Covarrubias***, *M. Antolini, "A Force and Touch Sensitive Self-Deformable Haptic Strip for Exploration and Deformation of Digital Surfaces", EuroHaptics 2010, Frans van der Helm (Editor). Amsterdam, July 2010.*

[C19.] ***M. Covarrubias***, *M. Bordegoni, U. Cugini, M. Antolini, "A Spline-Like Haptic Tool For Exploration And Modification Of Digital Models With Aesthetic Value". ASME 2010, World Conference on Innovative Virtual Reality (WINVR2010). Ames, Iowa, USA, May 2010.*

[C20.] *M. Bordegoni, U. Cugini,* ***M. Covarrubias***, *M. Antolini, "Geodesic Haptic Device for surface rendering", Joint Virtual Reality Conference of EGVE - ICAT – EuroVR, 2009, M. Hirose, D. Schmalstieg, C. A. Wingrave, and K. Nishimura (Editors). Lyone, France, December 2009.*

[C21.] *M. Bordegoni, F. Ferrise,* ***M. Covarrubias***, *M. Antolini, "A Linear Haptic Interface for the Evaluation of Shapes", ASME 2009 International Design Engineering Technical Conferences (IDETC) & Computers and Information in Engineering Conference (CIE), S. Diego, CA, USA, Agoust 30 - September 2, 2009, doi: http://dx.doi.org/10.1115/DETC2009-86953*

[C22.] ***M. Covarrubias***, *M. Bordegoni, U. Cugini, M. Antolini, "A 6-DOF haptic strip for representing and modifying the surface of virtual objects", Proceedings of the 5° Cuban Mechanical Engineer workshop 2008, Universidad de la CUJAE, la Habana, Cuba. December 1-6. ISBN 978-959-261-281-5, 47-51*

[C23.] *M. Bordegoni, U. Cugini,* ***M. Covarrubias***, *"Design of a Visualization System integrated with Haptic Interfaces", Proceedings of the TMCE 2008, April 21–25, 2008, Izmir, Turkey, Edited by I. Horváth and Z. Rusák © Organizing Committee of TMCE 2008, ISBN 978-90-5155-044-3*

[C24.] *M. Bordegoni,* ***M. Covarrubias***, *"Augmented Visualization System for a Haptic Interface", HCI International 2007, Beijing, P.R. China [Poster paper]*

[C25.] *M. Bordegoni,* ***M. Covarrubias***, *"Direct Visuo-Haptic Display System Using a Novel Concept", IPT-EGVE 2007, 13° Eurographic Symposium on Virtual Environments. Weimar, Germany. Editor: B. Fröhlich, R. Blach, and R. van Liere. ISBN 978-3-905673-64-7, 33-34 [Poster paper]*

4.4 National Conferences

[NC1] ***M. Covarrubias***, *E. Gatti, M. Bordegoni, U. Cugini*, "*Supporto per persone disabili durante operazioni di taglio mediante l'utilizzo di una guida haptic*", La Medicina Incontra la Realtà Virtuale: Applicazioni in Italia della Realtà Virtuale in Medicina e Chirurgia. MIMOS 2011, Bologna, Italy. November 2011.

4.5 Hands-On Demos

[HD1] **M. Covarrubias**, M. Bordegoni, U. Cugini, *"Multimodal Guidance system for Post Stroke Arm and Fore Arm Rehabilitation"*, In: Collaborative Working Enviroment. Human Empowerment Aging and Disability (HEAD Project) 2013, Villa Beretta Rehabilitation Centre, Costa Masnaga, Italy. September 2013.

[HD2] **M. Covarrubias**, M. Bordegoni, U. Cugini, *"Multimodal Guidance system for improving manual skills in disable people"*, In: International Conference on Computers Helping People with Special Needs. ICCHP 2012, Linz, Austria. July 2012.

[HD3] **M. Covarrubias**, M. Bordegoni, U. Cugini, *"Supporting Down People Through Haptic Technology"*, In: ASME 2011 World Conference on Innovative Virtual Reality (WINVR2011). Milan, Italy. June 2011.

[HD4] **M. Covarrubias**, M. Bordegoni, U. Cugini, *"Supporting Down people in manual tasks through haptic technology"*, In: 4th International Conference on Down Syndrome, Present meets future. Republic of San Marino. May 2011.

4.6 Technical Reports

[TR1] P. Bosinco, N. Rejneri (think3) [France], P. Lammertse (FCS) [Holland], U. Cugini, N. Pasini, **M. Covarrubias**, F. Ferrise (PoliMI) [Italy], B. De Araujo (INESC-ID) [Portugal], D. Hermes, S.B. Shelley (TUE) [Holland]. *"SATIN system conception"* Internal Report, SATIN project, 2009.

[TR2] U. Cugini, **M. Covarrubias**, F. Ferrise, N. Pasini (PoliMI), P. Bosinco (think3), P. Lammertse (FCS), B. De Araujo (INESC-ID) D. Hermes, S.B. Shelley (TUE) S.Sharples, A. Stedmon, J. Hollowood (UNott), *"Theoretical foundations"*, SATIN Deliverable D5, SATIN project, 2008.

[TR3] U. Cugini, M. Antolini, **M. Covarrubias** (PoliMI). *"Development and Integration"*, SATIN Deliverable D14.1, SATIN project, 2008.

[TR4] **M. Covarrubias** and U. Cugini (PoliMi) [Italy], P. Lammertse (FCS) [Holland]. *"Optimization of the Haptic Strip Mechanism"*. Internal Technical Report, SATIN project, 2008.

[TR5] **M. Covarrubias**, U. Cugini (PoliMi) [Italy], and P. Lammertse (FCS) [Holland]. *"6-DOF platform analysis for the Haptic Strip mechanism"*. Internal Technical Report, SATIN project, 2008.

[TR6] P. Lammertse (FCS), **M. Covarrubias**, F. Ferrise, N. Pasini (PoliMI), P. Bosinco (think3), B. De Araujo (INESC-ID), D. Hermes, S.B. Shelley (TUE) *"Mock-UP"*, SATIN Deliverable D7.2, SATIN project, 2007.

5. Presentations at international conferences

[IC1.] ***M. Covarrubias**, M. Bordegoni, U. Cugini, "Interacting Game and Haptic System Based on Point-Based Approach for Assisting Patients after Stroke", International Conference on Computers Helping People with Special Needs. ICCHP 2014, Saint-Denis; France. July 2014.*

[IC2.] ***M. Covarrubias**, E. Gatti, M. Bordegoni, U. Cugini, A. Mansutti, "Multimodal Guidance system for improving manual skills in disable people", International Conference on Computers Helping People with Special Needs. ICCHP 2012, Linz, Austria. July 2012.*

[IC3.] ***M. Covarrubias**, E. Gatti, M. Bordegoni, U. Cugini, "Supporto per persone disabili durante operazioni di taglio mediante l'utilizzo di una guida haptic.", La Medicina Incontra la Realtà Virtuale: Applicazioni in Italia della Realtà Virtuale in Medicina e Chirurgia. MIMOS 2011, Bologna, Italy. November 2011.*

[IC4.] ***M. Covarrubias**, M. Bordegoni, U. Cugini, "Supporting Down People In Cutting Operations Through Haptic Technology", In: IADIS International 2011. Rome, Italy. July 2011.*

[IC5.] ***M. Covarrubias**, M. Antolini, M. Bordegoni, U. Cugini, "TRIZ approach applied to improve and optimize a Haptic Strip device for Exploration and Deformation of Virtual Surfaces", Triz Future Conference 2010 - University of Bergamo, Bergamo - Italy, Novembre 2010.*

[IC6.] *M. Bordegoni, U. Cugini, **M. Covarrubias**, M. Antolini, "A Force and Touch Sensitive Self-Deformable Haptic Strip for Exploration and Deformation of Digital Surfaces", EuroHaptics 2010, Frans van der Helm (Editor). Amsterdam, July 2010.*

[IC7.] *M. Bordegoni, U. Cugini, **M. Covarrubias**, M. Antolini, "Geodesic Haptic Device for surface rendering", Joint Virtual Reality Conference of EGVE - ICAT – EuroVR, 2009,*

M. Hirose, D. Schmalstieg, C. A. Wingrave, and K. Nishimura (Editors). Lyone, France, December 2009.

[IC8.] ***M. Covarrubias**, M. Bordegoni, U. Cugini, M. Antolini, "A 6-DOF haptic strip for representing and modifying the surface of virtual objects", Proceedings of the 5° Cuban Mechanical Engineer workshop 2008, Universidad de la CUJAE, la Habana, Cuba. December 1-6. ISBN 978-959-261-281-5, 47-51*

[IC9.] *M. Bordegoni, **M. Covarrubias**, "Direct Visuo-Haptic Display System Using a Novel Concept", IPT-EGVE 2007, 13° Eurographic Symposium on Virtual Environments. Weimar, Germany. Editor: B. Fröhlich, R. Blach, and R. van Liere. ISBN 978-3-905673-64-7, 33-34 [Poster paper]*

6. Other experiences

Invited Professor in the Academic Leaders Program at ITESM-Puebla, México.

Mario Covarrubias participates in the Academic Leaders Program organized by the Instituto Tecnologico y de Estudios Superiores de Monterrey, campus Puebla, México. (ITESM-Puebla). The Academic Leaders Program was implemented in order to further traditional university education and bring nationally and internationally renowned academics and professionals to the classroom. In this “hands on” approach, the students and professors are given the unique opportunity to interact directly with respected professionals in various areas of expertise.

From 18th to 22th February Mario Covarrubias has given talks and workshops at the ITESM-Puebla, Mexico:

Conferences:

- *Augmented and Virtual Reality Technologies, academic and industrial applications*
- *Haptic Systems, academic and industrial applications*

Workshops:

- *Kinematic Simulation through MSC_VisualNastran and Simulink*
- *FEM industrial Analysis through MSC-Patran and MSC-Nastran*
- *Advanced Surface Design with CATIA V5*

Mario Covarrubias

Milano, 07/23/2014