

CURRICULUM VITAE

Fall 2018

Contents

1 Personal	1
2 Education	1
3 Employment	1
4 Awards and Distinctions	2
5 Research	3
5.1 Research Contributions (trainees underlined)	3
5.1.1 Articles in Journals	3
5.1.2 Chapters In Books	6
5.1.3 Papers in Refereed Conference Proceedings (and Posters)	8
5.1.4 Patents	14
5.1.5 Recent Invited Lectures	15
5.1.6 Technical Reports	18
5.1.7 Mention in the press (21st century only)	19
5.2 Research Grants and Contracts	20
5.2.1 Current	20
5.2.2 Completed	20
6 Teaching	23
6.1 Courses Taught	23
6.1.1 Université Pierre et Marie Curie	23
6.1.2 Politecnico Di Milano	23
6.1.3 McGill University	23
6.1.4 Université Paris XI	23
6.1.5 Purdue University	23
6.2 Supervision	23
6.2.1 London University	23
6.2.2 Sorbonne Université (formely Université Pierre et Marie Curie)	23
6.2.3 McGill University	25
7 Services	27
7.1 Departmental, Faculty and University Committees	27
7.1.1 University Level at UPMC	27
7.1.2 University Level at McGill	27
7.1.3 Faculty Level at McGill	27
7.1.4 Departmental Level at McGill	28
7.2 Professional Activities	28
7.2.1 Editorship	28
7.2.2 Private Advising	28
7.2.3 Appointments with Agencies and Societies	28
7.2.4 Societies	29
7.2.5 Start-Up Companies	29
7.2.6 Ad Hoc Referee Appointments for Journals and Conferences	29
7.2.7 Grant Application Refereeing	31
7.2.8 Program Committees	32
7.2.9 Organization of Activities	32

1 Personal

Vincent Hayward Professeur, 1^{re} classe, Section 61 (on leave)
Institut des Systèmes Intelligents et Robotique
Sorbonne Université (formerly Université Pierre et Marie Curie, Paris 6)
4 place Jussieu, 75005 Paris, France
Tél: 33 (0)1 44 27 51 87 – Fax: 33 (0)1 44 27 51 45
Email: vincent.hayward@isir.upmc.fr URL: <http://people.isir.upmc.fr/hayward>
French and Canadian citizen

2 Education

- 1978–1981 Thèse de Docteur Ingénieur, Université de Paris XI at Orsay, France
“Langages d’analyse de programmes assemblés pour différentes machines et applications de ces langages”
(Languages to analyze assembled programs for several machines and applications)
Supervisor: Dr. A. Osorio
- 1978 Diplôme d’études approfondies, Université de Nantes (Qualifying exams)
“Exploitation d’une base de donnée en vue de l’identification”(Database for process identification)
Supervisor: Prof. R. Mezencev
- 1975–1978 Diplôme d’Ingénieur, Ecole Centrale de Nantes (then ENSM), Nantes, France
National Engineering School. General mechanical engineering, concentration in Systems and Control
- 1972–1975 Classes Préparatoires aux Grandes Ecoles, Lycée J. B. Say, Paris, France

3 Employment

- 2017– *Professor of Tactile Perception and Technologies*, Institute of Philosophy, School of Advanced Study, University of London (part time)
- 2017– *Chief Scientific Officer*, Actronika SAS, Paris (part time)
- 2011– *Professeur* (on leave 2017–) Institut des Systèmes Intelligents et de Robotique, Université Pierre et Marie Curie
- 2008–2011 *Professeur* (associé), Institut des Systèmes Intelligents et de Robotique, Université Pierre et Marie Curie
Chaire internationale d’haptique de l’UPMC
Teaching graduate courses in haptics and control systems
Research in design and applications of haptic devices, robotics, control
- 2006–2011 *Professor* (on leave 2008–11), Dept. of Electrical Engineering, McGill University, Montréal, QC Canada
Teaching undergraduate and graduate courses in computer engineering and control systems
Research in design and applications of haptic devices, robotics, control
Duties in departmental, faculty, and university affairs
- 2006–2007 *Professeur Invité*, Université Pierre et Marie Curie
- 2001–2004 *Director*, Center for Intelligent Machines, McGill University, Montréal, Qc Canada
Overseeing of the Center scientific orientation, operation, and representation
- 2003–2010 *Membre*, Centre de Recherche Interdisciplinaire en Réadaptation du Montréal Métropolitain (CRIR)
- 2002– *Associate member*, Center of Interdisciplinary Research in Music Media and Technology (CIRMMT)
- 2000–2009 *Scientist*, part-time employee of Immersion Corporation
- 1994–2006 *Associate Professor*, Department of Electrical and Computer Eng., McGill University, Montréal, Qc Canada
- 1989–1994 *Assistant Professor*, Department of Electrical Engineering, McGill University, Montréal, Qc Canada
- 1985–1989 *Adjunct Professor*, Department of Electrical Engineering, McGill University Montréal, Qc Canada
Research in the area of robotics, and teaching a graduate course
- 1985–2010 *Member*, Center for Intelligent Machines, McGill University, Montréal, Qc Canada
- 1985–1986 *Visiting Scientist*, Pulp and Paper Research Institute of Canada
Evaluation of advanced manufacturing techniques for application in the pulp and paper industry
- 1983–1985 *Attaché* then *Chargé de Recherche* at the Centre National de la Recherche Scientifique (CNRS)
Laboratoire d’Informatique et de Mécanique pour les Sciences de l’Ingénieur (LIMSI), Orsay, France
Research in manufacturing and robotics
- 1984 *Consultant*, Hewlett Packard Laboratories, Manufacturing Research Center, Palo Alto, California, USA
Research in robot programming
- 1982–1983 *Visiting Assistant Professor*, Purdue University, School of Electrical Engineering, West Lafayette, Indiana, USA
Research in robot control and teaching at the undergraduate level

- 1981–1982 *Visiting Scholar*, Purdue University, School of Electrical Engineering, West Lafayette, Indiana, USA
Research in the area of robot programming
- 1978–1981 *Graduate Research Assistant*, Laboratoire d'Informatique et de Mécanique pour les Sciences de l'Ingénieur
- 1977 *Research Assistant*, Institut de Recherche en Automatique et Informatique (IRIA), Domaine de Voluceau
Research in performance measurement of mainframe computers

4 Awards and Distinctions

- 2018 Best Demonstration Award, EuroHaptics Conference, Pisa, Italy.
- 2018 Keynote, Workshop on active touch for perception and interaction, ICRA 2018, Brisbane, Australia
- 2018 Keynote Speaker, Cross-Cutting Challenges, IEEE Haptics Symposium, San Francisco, CA, USA
- 2018 Best Paper Award for 2017, IEEE Transactions on Haptics
- 2018 Keynote Speaker, UK & Ireland IEEE Robotics and Automation Conference, London, UK
- 2017 Plenary Speaker, 43rd International Conference On Micro And Nano-engineering, Braga, Portugal
- 2017 Keynote Speaker, IEEE/RSJ International Conference on Intelligent Robots and Systems, Vancouver, BC, Canada
- 2017 Leverhulme Trust Visiting Professorship, University of London
- 2016 Keynote Speaker, Handicap 2016, Paris, France
- 2015 Best Paper Award (honorable mention), World Haptics 2015, Chicago, USA.
- 2014 Invited Speaker, AsiaHaptics 2014, Tsukuba, Japan
- 2014 Best Paper Award (poster presentation) Eurohaptics 2014, Versailles, France
- 2014 Best Paper Award (honorable mention, oral presentation) Eurohaptics 2014, Versailles, France
- 2013 Distinguished Lecture Series, Department of Computing Science, University of British Columbia, Canada
- 2012 Plenary Speaker 2012 IEEE Int. Conf. on Multisensor Fusion and Information Integration, Hamburg, Germany
- 2012 Lecturer, Series 'Robotique, les fondations d'une discipline', Collège de France, Paris
- 2010 Keynote Speaker, Haptic Audio Interaction Design 2010, Copenhagen, Denmark
- 2010 Plenary Speaker, 32nd Annual Int. Conf. of the IEEE Engineering in Med. and Bio. Society, Buenos Aires, Argentina
- 2010 Keynote Speaker, Joint European Meeting, EuroVR-EVE, Orsay, France
- 2010 Best Paper Award, Eurohaptics, Amsterdam, the Netherlands
- 2010 Top Reviewer for the Journal of Neuroscience Methods in 2009
- 2009 Lectio Magistralis, University of Verona, Verona, Italy
- 2008 Elected Fellow of the IEEE
- 2007 Lecturer, The Cutting Edge: Royal Society Lectures in Science, McGill University
- 2007 Best Paper Award (applications), World Haptics 2007, Salt Lake City, Utah, USA
- 2006 Keynote Speaker, 8th International IFAC Symposium on Robot Control, SYROCO 2006, Bologna, Italy
- 2006 Best Demonstration Award, Eurohaptics 2006, Paris
- 2006 Opening Lecture, 2nd Enactive Workshop, Montréal, Canada
- 2006 Invited Lecture, Journées ROBEA, CNRS, Paris, France
- 2006 Best Paper Award, ACM CHI'06 Conference, Montréal, Canada
- 2006 Best Paper Award, 14th Symposium on Haptic Interfaces For Virtual Environ. & Teleop. Syst., Arlington, USA
- 2005 Keynote Lecture, Dutch-Belgium Haptics Society, Brussels, Belgium
- 2004 Keynote Speaker, Eurohaptics, Munich, Germany
- 2003 Outstanding Reviewer for Automatica, Journal of the International Federation of Automatic Control
- 2002 The E. (Ben) & Mary Hochhausen Award for Res. in Adaptive Technology For Blind and Visually Impaired Persons
- 2001 Plenary Speaker, Workshop On Advances In Interactive Multimodal Telepresencessystems, Munich, Germany
- 2001 Opening Lecture, IEEE ICMA Conference, Osaka, Japan
- 2000 Distinguished Lecture Series, Department of Computing Science, University of Alberta, Canada
- 1995 Best Demonstration Award, 1995 IRIS-PREARN Conference, Ottawa, Canada
- 1994 Best Paper Award: 8th Canadian Astronautics and Space Institute Annual Conference
- 1991 NASA Space Act Tech Brief Award (as a result of work on robot programming for JPL)

5 Research

5.1 Research Contributions (trainees underlined)

5.1.1 Articles in Journals

- j99 Fairhurst, M. T., Travers, E., Hayward, V., and Deroy, O. 2018. Confidence Is Higher in Touch Than in Vision in Cases of Perceptual Ambiguity. *Scientific Reports*, 8:15604.
- j98 Dupin, L., Hayward, V., Wexler, M. 2018. Radial Trunk-Centred Reference Frame in Haptic Perception. *Scientific Reports*, 8:13550.
- j97 Miller, L. E., Montroni, L., Koun, E., Salemme, R., Hayward, V., Farnè, A. 2018. Sensing With Tools Extends Somatosensory Processing Beyond The Body. *Nature*, 561(7722):239–242.
- j96 Bochereau, S., Sinclair, S., and Hayward, V. 2018. Perceptual Constancy in the Reproduction of Virtual Tactile Textures With Surface Displays. *ACM Transactions on Applied Perception*, 15(2):10.
- j95 Dzidek, B., Bochereau, S., Johnson, S. A., Hayward, V., and Adams, M. J. 2017. Why Pens Have Rubbery Grips. *Proceedings of the National Academy of Sciences*, 114(41):10864–10869.
- j94 Pacchierotti, C., Sinclair, S., Solazzi, M., Frisoli, A., Hayward, V., and Prattichizzo, D. 2017. Wearable Haptic Systems for the Fingertip and the Hand: Taxonomy, Review, and Perspectives. *IEEE Transactions on Haptics*, 10(4):580–600.
- j93 Bochereau, S., Dzidek, B., Adams, J. M., and Hayward, V. 2017. Characterizing and imaging gross and real finger contacts under dynamic loading. *IEEE Transactions on Haptics*, 10(4):456–465. (Best Paper Award for 2017)
- j92 Lu, T., Pacoret, C., Hériban, D., Mohand-Ousaid, A., Régnier, S., and Hayward, V. 2017. Kilohertz Bandwidth, Dual-Stage Haptic Device Lets You Touch Brownian Motion. *IEEE Transactions on Haptics*, 10(3):382–390.
- j91 Dupin, L., Hayward, V., Wexler, M. 2017. Generalized Movement Representation In Haptic Perception. *Journal of Experimental Psychology: Human Perception and Performance*, 43(3):581–595.
- j90 Cai, D., Bidaud, Ph., Hayward, V., Gosselin, F. 2017. Self-Adjustment Mechanisms And Their Application For Orthosis Design. *Meccanica*, 52(3):713–728.
- j89 Shao, Y., Hayward, V., Visell, Y. 2016. Spatial Patterns of Cutaneous Vibration During Whole-Hand Haptic Interactions, *Proceedings of the National Academy of Sciences*, 113(15):4188–4193.
- j88 Gueorguiev, D., Bochereau, S., Mouraux, A., Hayward, V. and Thonnard, J-L. 2016. Touch Uses Frictional Cues To Discriminate Optically Flat Materials. *Scientific Reports*, 6:25553.
- j87 Moscatelli, A., Bianchi, M., Serio, A., Terekhov, A., Hayward, V., Ernst, M. O., Bicchi, A. 2016. The Change In Fingertip Contact Area As A Novel Proprioceptive Cue, *Current Biology*, 26(9):1159–1163.
- j86 Platkiewicz, J., Lipson, H., Hayward, V. 2016. Haptic Edge Detection Through Shear. *Scientific Reports*, 6:23551.
- j85 Deroy, O., Fasiello, I., Hayward, V., Auvray, M. 2016. Differentiated Audio-Tactile Correspondences In Sighted And Blind Individuals. *Journal of Experimental Psychology: Human Perception and Performance*, 42(8):1204–1214.
- j84 Okamoto, S., Wiertlewski, M., Hayward, V. 2016. Anticipatory Vibrotactile Cueing Facilitates Grip Force Adjustment During Perturbative Loading. *IEEE Transactions on Haptics*, 9(2):233–242.
- j83 Moscatelli, A., Hayward, V., Wexler, M., Ernst, M. O. 2015. Illusory Tactile Motion Perception: An Analog Of The Visual Filehne Illusion. *Scientific Reports*, 5:14584.
- j82 Terekhov, A. V., Hayward, V. 2015. The Brain Uses Extra-Somatic Information To Estimate Limb Displacement. *Proceedings of the Royal Society, B*, 282(1814):20151661
- j81 Hudin, C., Lozada, J., Hayward, V. 2015. Localized Tactile Feedback on a Transparent Surface Through Time-Reversal Wave Focusing. *IEEE Transactions on Haptics*, 8(2):188-198.
- j80 Mohand-Ousaid, A., Haliyo, S., Régnier, S., Hayward, V. 2015. A Stable and Transparent Microscale Force Feedback Teleoperation System. *IEEE/ASME Transactions on Mechatronics*, 20(5):2593–2603.
- j79 Dupin, L., Hayward, V. Wexler, M. 2015. Direct Coupling of Haptic Signals Between Hands. *Proceedings of the National Academy of Sciences*, 112(2):619–624.
- j78 Mohand-Ousaid, A., Millet, G., Haliyo, S., Régnier, S., Hayward, V. 2014. Feeling What An Insect Feels. *Public Library of Science ONE*, 9(10):e108895.
- j77 Jörntell, H., Bengtsson, F., Geborek, P., Spanne, A., Terekhov, A. V., Hayward, V. 2014. Segregation of Tactile Input Features in Neurons of the Cuneate Nucleus. *Neuron*. 83:1444–1452.
- j76 Sinclair, S., Wanderley, M. M., Hayward, V. 2014. Velocity Estimation Algorithms For Audio-Haptic Simulations Involving Stick-Slip. *IEEE Transactions on Haptics*. 7(4):533–544.
- j75 Hayward, V., Terekhov, A. V., Wong, S.-C., Geborek, P., Bengtsson, F., Jörntell, H. 2014. Spatio-Temporal Skin Strain Distributions Evoke Low Variability Spike Responses In Cuneate Neurons. *Journal of the Royal Society Interface*,

11(93):20131015.

- j74 Platkiewicz, J., Hayward, V. 2014. Perception-Action Dissociation Generalizes to the Size-Inertia Illusion. *Journal of Neurophysiology*, 111(7):1409–1416
- j73 Hudin, C., Lozada, J., Hayward V. 2014. Spatial, Temporal, and Thermal Contributions To Focusing Contrast By Time Reversal in a Cavity. *Journal of Sound and Vibration*, 333(6):1818–1832.
- j72 Klöcker, A., Wiertlewski, M., Théate, V., Hayward, V., Thonnard, J.-L. 2013. Physical Factors Influencing Pleasant Touch During Tactile Exploration. *Public Library of Science ONE*, 8(11):e79085.
- j71 Castañós, F., Gromov, D., Hayward, V., Michalska, H. 2013. Implicit And Explicit Representations Of Continuous-Time Port-Hamiltonian Systems. *Systems & Control Letters*, 62(4):324–330.
- j70 Adams, M. J., Johnson, S. A., Lefèvre, Ph., Lévesque, V., Hayward, V., André, T., Thonnard, J.-L. 2013. Finger Pad Friction And Its Role In Grip And Touch. *Journal of the Royal Society Interface*, 10(80):20120467.
- j69 Frissen, I., Ziat, M., Champion, G., Hayward, V. and Guastavino, C. 2012. Auditory-Haptic and Haptic-Haptic Temporal Order Judgements During Passive and Active Arm Movements, *Acta Psychologica*, 141:140–148
- j68 Delhaye, B., Hayward, V., Lefèvre, Ph., and Thonnard, J.-L. 2012. Texture-Induced Vibrations In The Forearm During Tactile Exploration. *Frontiers in Behavioral Neuroscience*, 6(7):1–10
- j67 Wiertlewski, M., Hayward, V. 2012. Mechanical Behavior of the Fingertip in the Range of Frequencies and Displacements Relevant to Touch, *Journal of Biomechanics*, 45(11):1869–1874
- j66 Giordano, B. L., Visell, Y., Yao, H.-Y., Hayward, V., Cooperstock, J., and McAdams, S. 2012. Identification Of Ground Materials In Auditory, Kinesthetic, Haptic And Audiohaptic Conditions. *Journal of the Acoustical Society of America*, 131(5):4002–4012
- j65 Wiertlewski, M., Hayward, V. 2012. Transducer For Mechanical Impedance Testing Over a Wide Frequency Range Through Active Feedback. *Review of Scientific Instruments*, 83(2):025001
- j64 Mohand-Ousaid, A., Millet, G., Régnier, S., Haliyo, S., and Hayward, V., 2012. Haptic Interface Transparency Achieved Through Viscous Coupling. *International Journal of Robotics Research*, 31(3):319–329
- j63 Wiertlewski, M., Hayward, V. 2011. Les Interfaces Tactiles, *Biofutur*, 30(326):38–40
- j62 Fasiello, I., Hayward, V. 2011. Un Sens Trompeur, *Biofutur*, 30(326):42–43
- j61 Terekhov, A. V., Hayward, V. 2011. Minimal Adhesion Surfaces In Tangentially Loaded Digital Contacts. *Journal of Biomechanics*, 44(13):2508–2510
- j60 Hayward, V. 2011. Is There a ‘Plenhaptic’ Function? *Philosophical Transactions of the Royal Society B*, 366(1581):3115–3122
- j59 Gosline, A. H. C., Hayward, V., Michalska, H. 2011. Ineluctability of Oscillations in Systems With Digital Implementation of Derivative Feedback. *Automatica*, 47(11):2444–2450
- j58 André, T., Lévesque, V., Hayward, V., Lefèvre, P., and Thonnard, J.-L. 2011. Effect Of Skin Hydration On The Dynamics Of Fingertip Gripping Contact. *Journal of the Royal Society Interface*, 8(64):1574–1583
- j57 Wiertlewski, M., Lozada, J., Hayward, V. 2011. The Spatial Spectrum Of Tangential Skin Displacement Can Encode Tactile Texture. *IEEE Transactions on Robotics*, 27(3):461–472
- j56 Ziat, M., Hayward, V., Chapman, C. E., Ernst, M. O., and Lenay, C. 2010. Tactile Suppression of Displacement, *Experimental Brain Research*, 206(3):299–310
- j55 Yao, H.-Y. and Hayward V. 2010. Design and Analysis of A Recoil-Type Vibrotactile Transducer. *Journal of the Acoustical Society of America*. 128(2):619–627
- j54 Smith, A. M., Basile, G., Theriault-Groom, J., Fortier-Poisson, P., Champion, G., Hayward, V. 2010. Roughness of simulated surfaces examined with a haptic tool; effects of spatial period, friction, and resistance amplitude. *Experimental Brain Research*, 202(1):33–43
- j53 Wang, Q., Hayward, V. 2010. Biomechanically Optimized Distributed Tactile Transducer Based on Lateral Skin Deformation. *International Journal of Robotics Research*, 29(4):323–335
- j52 Smith, A. M., Chapman, C. E., Donati, F., Fortier-Poisson, P. and Hayward, V. 2009. Perception of simulated local shapes using active and passive touch. *Journal of Neurophysiology*, 102:3519–3529
- j51 Konkle, T., Wang, Q., Hayward, V., and Moore, C. I. 2009. Motion after-effects transfer between touch and vision, *Current Biology*, 19(9):745–750.
- j50 Gosline, A. H. and Hayward, V. 2009. Dual-Channel Haptic Synthesis of Viscoelastic Tissue Properties Using Programmable Eddy Current Brakes. *International Journal of Robotics Research*, 28(10):1387–1399.
- j49 Champion, G. and Hayward, V. 2009. Fast Calibration Of Haptic Texture Synthesis Algorithms. *IEEE Transactions on*

Haptics, 2(2):85–93

- j48 Wijntjes, M. W. A., Sato, A., Hayward, V. Kappers, A. M. L. 2009. Local Surface Orientation Dominates During Haptic Curvature Discrimination. *IEEE Transactions on Haptics*, 2(2):94–102
- j47 Hayward, V. Armstrong, B. S., Altpeter, F., and Dupont, P. E. 2009. Discrete-Time Elasto-Plastic Friction Estimation. *IEEE Transactions on Control Systems Technology*, 17(3):688–696
- j46 Petit, G., Dufresne, A., Lévesque, V., Hayward, V. 2008. Exploration multimodale d'images pour des utilisateurs ayant une déficience visuelle. *Sciences et Technologies pour le Handicap*, 2(2):175–186
- j45 Gosline, A. H., Hayward, V. 2008. Eddy Current Brakes for Haptic Interfaces: Design, Identification, and Control. *IEEE/ASME Transactions on Mechatronics*, 13(6):669–677
- j44 Carter, O., Konkle, T., Wang, Q., Hayward, V., Moore, C. I. 2008. Tactile Rivalry Demonstrated with an Ambiguous Apparent-Motion Quartet. *Current Biology*, 18(14):1050–1054
- j43 Campion, G., Hayward, V. 2008. On The Synthesis of Haptic Textures. *IEEE Transactions on Robotics*, 24(3):527–536
- j42 MacLean, K. E. and Hayward, V. 2008. Do It Yourself Haptics, Part-II. *IEEE Robotics and Automation Magazine*, 15(1):104–114
- j41 Wang, Q., Hayward, V. 2008. Tactile Synthesis and Perceptual Inverse Problems Seen from the View Point of Contact Mechanics. *ACM Transactions on Applied Perception*, 5(2):1–19
- j40 Hayward, V. 2008. A Brief Taxonomy of Tactile Illusions And Demonstrations That Can Be Done In a Hardware Store. *Brain Research Bulletin*, 75:742–752
- j39 Hayward, V. et K. E. MacLean, V. 2007. Do It Yourself Haptics, Part-I. *IEEE Robotics and Automation Magazine*, 14(4):88–104
- j38 Janabi-Sharifi, F., V. Hayward, V., Wang, Q. Y. 2007. Design and implementation of a graphic-haptic display system. *Displays*, 28:118–128
- j37 Pasquero, J., Luk, J., Lévesque, V., Wang, Q., MacLean, K., Hayward, V. 2007. Haptically Enabled Handheld Information Display with Distributed Tactile Transducer. *IEEE Transactions on Multimedia*, 9(4):746–753
- j36 Wang, Q., Hayward, V. 2007. In Vivo Biomechanics of the Fingerpad Skin Under Local Tangential Traction. *Journal of Biomechanics*. 40(4):851–860
- j35 Yi, D., Hayward, V. 2006. Depth Discrimination with 2D Haptics During Static Viewing of 3D Angiograms. *Haptics-e*, 8(3)
- j34 Yao, H.-Y., Hayward, V. Ellis, R.E. 2005. A Tactile Enhancement Instrument for Minimally Invasive Surgery. *Computer Aided Surgery*, 10(4): 233–239
- j33 Cruz-Hernandez, J. M., Hayward. 2005. Position Stability of Phase Control for the Preisach Hysteresis Model. *Transactions of the CSME*, 29(2):129–142
- j32 Dostmohamed, H., Hayward, V. 2005. Trajectory of Contact Region On the Fingerpad Gives the Illusion of Haptic Shape. *Experimental Brain Research*, 164(3):387–394
- j31 Levesque, V., Pasquero, J., Hayward, V. and Legault. M. 2005. Display of Virtual Braille Dots by Lateral Skin Deformation: Feasibility Study. *ACM Transactions on Applied Perception*. 2(2):132–149
- j30 Mahvash, M., Hayward V. 2005. High Fidelity Passive Force Reflecting Virtual Environments. *IEEE Transactions on Robotics and Automation*. 21(1):38–46
- j29 Mahvash, M., Hayward V. 2004. High Fidelity Haptic Synthesis of Contact with Deformable Bodies. *IEEE Computer Graphics and Applications*, 24(2):48–55
- j28 Sidobre, D., Hayward V. 2004. Measurement of the Behavior of Mechanical Junctions From the Micrometer to the Subnanometer Scale: The Friction Force Scanner. *Measurement Science & Technology*, 15(2):451–459.
- j27 Hayward, V., Astley, O. R., Cruz-Hernandez, M., Grant, D., Robles de la Torre, G. 2004. Haptic Interfaces and Devices. *Sensor Review*. 24(1):16–29.
- j26 Greenish, S., Hayward, V., Chial, V., Okamura, A., Steffen, T. 2002. Measurement, Analysis and Display of Haptic Signals During Surgical Cutting. *Presence: Teleoperators and Virtual Environments*, MIT Press. Vol. 6(11):626–651
- j25 Yi, D., Hayward, V. 2002. Skeletonization of Volumetric Angiograms for Display. *Computer Methods in Biomechanics and Biomedical Engineering*. 5(5):329–341
- j24 Dupont, P., Hayward, V., Armstrong, B., Altpeter, F. 2002. Single State Elasto-Plastic Friction Models. *IEEE Transactions on Automatic Control*. 47(5):787–792
- j23 Cruz-Hernandez, J. M., Hayward V. 2001. Phase Control Approach to Hysteresis Reduction. *IEEE Transactions on Control Systems Technology*, 9(1):17–26

- j22 Robles De La Torre, G., Hayward, V. 2001. Force Can Overcome Object Geometry in the Perception of Shape Through Active Touch. *Nature*. 412:445–448
- j21 Lloyd, J. E., Hayward, V. 2001. Singularity Robust Trajectory Generation. *International Journal of Robotics Research*, 20(1):38–56
- j20 Mahvash, M., Hayward, V. 2001. Haptic Rendering of Cutting: a Fracture Mechanics Approach. *Haptics–e*, 2(3)
- j19 Dong, C. J., Swindale, N. V., Zakarauskas, P., Hayward, V., Cynader, M., 2000. The Auditory Motion After-Effect: Its Tuning And Its Specificity In The Spatial And Frequency domains. *Perception & Psychophysics*, 62(5):1099–1111
- j18 Janabi-Sharifi, F., Hayward, V., Chen, C.-S. J. 2000. Discrete-time Adaptive Windowing for Velocity Estimation. *IEEE Transactions on Control Systems Technology*, 8(6):1003–1009
- j17 Hayward, V., Cruz-Hernandez, J. M. 1998. Parameter Sensitivity Analysis for Design and Control of Force Transmissions. *ASME Journal of Dynamic Systems Measurement and Control*, 120(2):241–249
- j16 Grant, D., Hayward, V. 1997. Variable Structure Control of Shape Memory Alloy Actuators. *IEEE Systems and Control Magazine*, 17(3):80–88
- j15 Kurtz, R., Hayward, V. 1995. Dexterity Measures for Mechanisms with Unilateral Constraints: the N+1 Case. *Journal of Advanced Robotics*. 9(5):561–577
- j14 Hayward, V. Aubry, S., Foisy, A., Ghallab, Y. 1995. Collision Prediction Among Many Moving Objects. *International Journal of Robotics Research*. 14(2):129–143
- j13 Hayward, V., Nilakantan, A., Daneshmend, L. K. 1994. Trajectory Generation and Control for Automatic Manipulation. *Robotica*, Cambridge University Press, 12:115–125
- j12 Lloyd, E. J., Hayward, V. 1993. Trajectory Generation for Dynamic, Sensor-driven Environments. *International Journal of Robotics Research*, MIT Press, (12)4:380–394
- j11 Boyer, M., Daneshmend, L. K., and Hayward, V., 1993. Using *this method* to Plan and Execute Tasks in clos, *ACM-SIGPLAN, Lisp Pointers*, 3:3–12
- j10 Hayward, V., Nemri, C., Chen, X., Duplat, B. 1993. Kinematic Decoupling in Mechanisms and Application to a Passive Hand Controller. *Journal of Robotics Systems*, 10(5):767–790
- j09 Lloyd, J. E., Hayward, V. 1993. Real-Time Trajectory Generation in Multi-RCCL. *Journal of Robotics Systems*, 10(3):369–390
- j08 Izaguirre, A., Hashimoto, M., Paul, R. P., Hayward, V. 1992. A New Computational Structure for Real-time Dynamics. *International Journal of Robotics Research*, 11(4):346–362
- j07 Hayward, V. 1992. Physical Modeling Applies to Physiology Too. Commentary in *Behavior and Brain Sciences*, 15(2):342–343
- j06 Kurtz, R., Hayward, V. 1992. Multi-goal Optimization of a Parallel Mechanism with Actuator Redundancy. *IEEE Transactions on Robotics and Automation*. RA-8(5):633–651
- j05 Hayward, V., Kurtz, R. 1992. Modeling of a Parallel Wrist Mechanism with Actuator Redundancy. *International Journal of Laboratory Robotics and Automation*, 4(2):69–76
- j04 Nilakantan, A., Hayward, V. 1989. The Synchronization of Multiple Manipulators in Kali. *Robotics and Autonomous Systems*, 5:345–358
- j03 Lloyd, E. J., Hayward, V. 1988. Kinematics of Common Industrial Robots. *Robotics*, 4:69–191
- j02 Hayward, V., Paul, R. P. 1987. Robot Manipulator Control Under Unix: RCCL a Robot Control 'C' Library. *International Journal of Robotics Research*, 5(4):94–111
- j01 Hayward, V., Osorio, A. 1983. A system to automatically analyse assembled programs from machine descriptions. *IEEE Transactions on Software Engineering*, SE-9(2):210–213.

5.1.2 Chapters In Books

- c26 Farkhatdinov I., Michalska H., Berthoz A., Hayward V. 2019. Review of Anthropomorphic Head Stabilisation and Verticality Estimation in Robots. In *Biomechanics of Anthropomorphic Systems*, Venture G., Laumond JP., Watier B. (eds), Springer Tracts in Advanced Robotics, vol 124, pp. 185–209.
- c25 Hayward, V. 2018. A Brief Overview of the Human Somatosensory System. In *Musical Haptics*, Papetti, S. and Saitis, C. (Eds.), Springer, pp. 29-48
- c24 Hayward, V. 2016. Tactile Illusions. In *Scholarpedia of Touch*, Atlantis Press, pp. 327-342 [see online version c22]
- c23 Mohand-Ousaid, A., Lu, T., Pacoret, C., Régnier, S., Hayward, V. 2016. Dual Stage Options for Interface Designs Suitable for Haptic Interaction at the Micro-Nano Scales, in *Experimental Robotics*, Springer, pp. 105–114.
- c22 Hayward, V. 2015. Tactile Illusions. In *Encyclopedia of Touch*, Prescott, T. J. and Ahissar, E. (Eds.), *Scholarpedia*,

10(3):8245.

- c21 Xinjilefu, Hayward, V., and Michalska, H. 2010. Hybrid Stabilizing Control for the Spatial Double Inverted Pendulum. In *Int. Symposium on Brain, Body and Machine*, Angeles, J., Boulet, B., Clark, J. J., Kovecses, J. and Siddiqi, K. (Eds.), pp. 201–215.
- c20 Hayward, V. 2008. Haptic Shape Cues, Invariants, Priors, and Interface Design. In *Human Haptic Perception - Basics and Applications*, M. Grunwald (Ed.), Birkhauser Verlag. pp. 381–392
- c21 Hayward, V. 2007. Physically-Based Haptic Synthesis, In *Haptic Rendering: Foundations, Algorithms and Applications*, T. M. A. Otaduy and M. Lin (Eds), Wellesley, MA: A K Peters, Ltd., 297–309
- c19 Dostmohamed, H. and Hayward, 2005. V. Contact Location Trajectory on the Fingertip as a Sufficient Requisite for Illusory Perception of Haptic Shape and Effect of Multiple Contacts. in *Multi-point Interaction with Real and Virtual Objects*, F. Barbagli, D. Prattichizzo and K. Salisbury (Eds.), Springer Tracts in Advanced Robotics Vol. 18, pp.189–198
- c18 Mahvash, M., Hayward, V. 2003. Haptic Simulation of a Tool In Contact With a Nonlinear Deformable Body. In *IS4TM: International Symposium on Surgery Simulation and Soft Tissue Modelling*, Lecture Notes in Computer Science (LNCS 2673), N. Ayache and H. Delingette (Eds), Springer Verlag, New York, pp. 311–320
- c17 Hayward, V., Yi, D. 2003. Change of Height: An Approach to the Haptic Display of Shape and Texture Without Surface Normal. In *Experimental Robotics VIII*, Springer Tracts in Advanced Robotics 5, Springer Verlag, pp. 570–579
- c16 Hayward, V. 2001. Haptics: A Key to Fast Paced Interactivity. In *Human Friendly Mechatronics. Selected Papers, the International Conference on Machine Automation*, Osaka, Japan, Takano, M., Arai E., Arai T., Elsevier Science. (Plenary Talk, New Technologies Foundation Lecture)
- c15 Rovan, B., Hayward, V. 2000. Typology of Tactile Sounds and Their Synthesis in Gesture Driven Computer Music Performance. In *Trends in Gestural Control of Music*. Wanderley, M., Battier, M., (Eds). Editions IRCAM: Paris. pp. 297–320
- c14 Hayward, V., Armstrong, B. 2000. A New Computational Model of Friction Applied to Haptic Rendering. In *Experimental Robotics VI*, Peter Corke and James Trevelyan (Eds), Lecture Notes in Control and Information Sciences, Vol. 250, Springer-Verlag, pp. 403–412
- c13 Hayward, V. Gregorio, P. Astley, O. Greenish, S. Doyon, M. Lessard, L. McDougall, J. Sinclair, I. Boelen, S. Chen, X. Demers, J.-P. Poulin, J. Benguigui, I. Almey, N. Makuc, B. Zhang, X. 1998. Freedom-7: a High Fidelity Feven Axis Haptic Device with Application to Surgical Training. In *Experimental Robotics V*, Casals, A., de Almeida, A. T. (Eds.), Lecture Notes in Control and Information Science 232, pp. 445–456
- c12 Hayward, V., Cruz-Hernandez, M. J. 1997. Parameter Sensitivity Analysis for Design and Control of Tendon Transmissions. In *Experimental Robotics IV*, Khatib, O., Salisbury, J. K. (Eds.) Lecture Notes in Control and Information Sciences 223. pp. 241–252.
- c11 Hayward, V., Astley, O. R. 1996. Performance Measures for Haptic Interfaces. In *Robotics Research: The 7th International Symposium*, Giralt, G., Hirzinger, G., (Eds.), Springer Verlag. pp. 195–207.
- c10 Hayward, V., , Janvin, G., Ramstein, C. 1994. Design and Multi-Objective Optimization of a Linkage for a Haptic Interface. In *Advances in Robot Kinematics*. J. Lenarcic and B. Ravani (Eds.). Kluwer Academic. pp. 352–359
- c09 Hayward, V. 1994. Design of Hydraulic Robot Shoulder Based on Combinatorial Mechanism. In *Experimental Robotics 3*, Yoshikaswa, T., Myiazaki, F (Eds.), Lecture Notes in Control and Information Sciences 200. Springer Verlag. pp. 297–310
- c08 Foisy, A., Hayward, V 1994. A Safe Swept Volume Method for Collision Detection. In *Robotics Research, the Sixth International Symposium*. International Foundation for Rob. Res.. Cambridge, MA. pp. 62–68
- c07 Boulet, B., Daneshmend, L. K., Hayward, V., Nemri, C. 1993. System Identification and Modelling of a High Performance Hydraulic Actuator. *Experimental Robotics 2*, Chatila, R., Hirzinger, G. (Eds.), Lecture Notes in Control and Information Sciences, Springer Verlag
- c06 Hayward V. 1993. Borrowing Some Sesign Ideas from Biological Banipulators to Design an Artificial One. In *Robots and Biological Systems*, NATO Series, P. Dario, P. Aebisher, and G. Sandini, (Eds.), Springer Verlag. pp. 135–148
- c05 Hayward V. 1990. An Analysis of Redundant Manipulators from Several View-Points. In *Robots with Redundancy: Design, Sensing and Control*, NATO Series, A. Bejczy (Ed.), Springer Verlag, (17 pages)
- c04 Hayward, V. 1992. Review of “Kinematic Analysis and Design of Redundant Manipulators”, in *Robotics Review 2*, Khatib, O., Craig, J., and Lozano-Perez, T. (Eds.), MIT Press. pp. 191–195
- c03 Hayward, V., Kurtz, R. 1991. Modeling of a Parallel Wrist Mechanism with Actuator Redundancy. In *Advances in Robot Kinematics*. S. Stifter and J. Lenarcic (Eds). Springer Verlag, pp. 444–456
- c02 Daneshmend, L., Hayward, V. , Pelletier, M. 1990. Adaptation to Environment Stiffness in the Control of Manipulators. In *Experimental Robotics 1*, V. Hayward, O. Khatib (Eds.), Lecture Notes in Control and Information Science, 139, Springer Verlag, pp. 150–165

c01 Aubry, S., Hayward V. 1990. Building Hierarchical Solid Models From Sensor Data. In *Advances on Spatial Reasoning*, Su-shing Chen (Ed.), ALEX Publishing. pp. 1–64

5.1.3 Papers in Refereed Conference Proceedings (and Posters)

- p161 Duvernoy, B., Farkhatdinov, I., Topp, S., Hayward, V. 2018. Electromagnetic Actuator for Tactile Communication. *Proceedings of the Eurohaptics Conference*. pp. 14–24.
- p160 Kaneko, S., Kajimoto, H., and Hayward, V. 2018. A Case of Perceptual Completion in Spatio-Temporal Tactile Space. *Proceedings of the Eurohaptics Conference*, pp. 49–57.
- p159 Fradet, C., Manfredi, L. R., Bensmaia, S., Hayward, V. 2017. Fingertip skin as a linear medium for wave propagation, *Proceedings of the World Haptics Conference (WHC)*, IEEE, pp. 507–510.
- p158 Mutlu, Ö., Wottrich, V. M., Hayward, V. 2017. Contaminant resistant pin-based tactile display. *Proceedings of the World Haptics Conference (WHC)*, IEEE, pp. 165–170.
- p157 Ortega, A., Weill-Duflos, A., Haliyo, S., Régnier, S., Hayward, V. 2017. Linear induction actuators for a haptic interface: A quasi-perfect transparent mechanism. *Proceedings of the World Haptics Conference (WHC)*, IEEE, pp. 575–580.
- p156 Ziat, M. and Yao, H.-Y. and Schmitt, R. and Hayward, V. 2016. FrontPanel: Tangible User Interface for Touch-Screens Dedicated to Elderly. *Proceedings of the 2016 CHI Conference Extended Abstracts on Human Factors in Computing Systems*, pp. 3808–3811.
- p155 Dzidek, B., Bochereau, S., Johnson, S. A., Hayward, V., and Adams, M. J. 2016. Frictional dynamics of finger pads are governed by four length-scales and two time-scales. *Proceedings of the Haptic Symposium*, pp. 161–166.
- p154 Milner, T. E., Gassert, R., and Hayward, V. 2015. Exploratory movements in unconstrained tactile search with virtual surfaces. *Proceedings of the International Conference on Virtual Rehabilitation*, pp. 151–153.
- p153 Hartcher-O'Brien, J., Auvray, M., and Hayward, V. 2015. Perception of distance-to-obstacle through time-delayed tactile feedback. *Proceedings of the IEEE World Haptics 2015*. pp. 7–12.
- p152 Bochereau, S., Sinclair, S., and Hayward, V. 2015. Looking for Physical Invariants in the Mechanical Response of a Tactually Scanned Braille Dot. *Proceedings of the IEEE World Haptics 2015*, pp. 119–124.
- p151 Bergmann Tiest, W. M. and Hayward, V. 2015. Inside vs. Outside: Haptic Perception of Object Size. *Proceedings of the IEEE World Haptics 2015*. pp. 94–99.
- p150 Mouhand-Ousaid, A. M., Bolopion, A., Haliyo, S., Régnier, S., and Hayward, V., 2014. Stability and transparency analysis of a teleoperation chain for microscale interaction. *Proceedings of the 2014 IEEE International Conference on Robotics and Automation*, pp. 5946–5951.
- p149 Klöcker, A., Penta, M., Hayward, V., Thonnard J.-L., 2014, The Sensation of Pleasantness during Tactile Exploration. *Proceedings of the International Conference On Kansei Engineering And Emotion Research*.
- p148 Platkiewicz, J., Mansutti, A., Bordegoni, M., Hayward, V. 2014. Recording Device for Natural Haptic Textures Felt with the Bare Fingertip. *Proceedings of Eurohaptics 2014*, pp. 521–528.
- p147 Moscatelli, A., Bianchi, M., Serio, A., Al Atassi, O., Fani, S., Terekhov, A. V., Hayward, V., Ernst, M., and Bicchi, A. 2014. A change in the fingertip contact area induces an illusory displacement of the finger. *Proceedings of Eurohaptics 2014*, pp. 72–79. (Best Paper, poster presentation)
- p146 Dzidek, B., Adams, M. J., Zhang, Z., Johnson, S. A., Bochereau, S., Hayward, V. Role of Occlusion in Non-Coulombic Slip of the Finger Pad. *Proceedings of Eurohaptics 2014*, pp. 109–116
- p145 Hartcher-O'Brien, J., Terekhov, A. V., Auvray, M., Hayward, V. Haptic Shape Constancy Across Distance. *Proceedings of Eurohaptics 2014*, pp. 77–84.
- p144 Visell, Y., Duraikkannan, K. A., Hayward, V. A Device and Method for Multimodal Haptic Rendering of Volumetric Stiffness. *Proceedings of Eurohaptics 2014*, pp. 478–486
- p143 Bochereau, S., Terekhov, A. V., Hayward, V. 2014. Amplitude and Duration Interdependence in the Perceived Intensity of Complex Tactile Signals. *Proceedings of Eurohaptics 2014*, pp. 93–100. (Best Paper honorable mention, oral presentation)
- p142 Ziat, M., Frissen, I., Campion, G., Hayward, V., Guastavino, C. 2013, Plucked String Stiffness Affects Loudness Perception, *Proceedings of the Workshop on Haptic and Audio Interaction Design*. LNCS 7989, Springer-Verlag Berlin Heidelberg, pp. 79–88.
- p141 Mohand-Ousaid, A., Haliyo, S., Régnier, S. 2013. Micro-Force Sensor by Active Control of a Comb-Drive. *Proceedings of the IEEE/ASME International Conference on Advanced Intelligent Mechatronics*. pp. 612–617.
- p140 Hudin, C. Lozada, J., Hayward, V. 2013. Localized Tactile Stimulation by Time-Reversal of Flexural Waves: Case Study With a Thin Sheet of Glass. *Proceedings of the IEEE World Haptics Conference*, pp. 67–72.
- p139 Mohand-Ousaid, A., Haliyo, S., Régnier, S. and Hayward, V. 2013. H-infinity optimal control for micro-force sensing. *Proceedings of the 3rd International Conference on Systems and Control (ICSC13)*, pp. 490–495.

- p138 Okazaki, R., Hachisu, T., Sato, M., Fukushima, S., Hayward, V., Kajimoto, K. 2013. Judged Consonance of Tactile and Auditory Frequencies. *Proceedings of the IEEE World Haptics Conference*. pp. 663–666.
- p137 Wiertelwski, M., Endo, S., Wing, A. M., Hayward, V. 2013. Slip-Induced Vibration Influences the Grip Reflex: A Pilot Study. *Proceedings of the IEEE World Haptics Conference*. pp. 627–632.
- p136 Okamoto, S., Wiertelwski, M., Hayward, V. 2013. Anticipatory vibrotactile cueing facilitates grip force adjustment. *Proceedings of the IEEE World Haptics Conference*. pp. 525–530.
- p135 Farkhatdinov, I., Ouarti, N., Hayward, V. 2013. Vibrotactile Inputs To The Feet Can Modulate Vection. *Proceedings of the IEEE World Haptics Conference*. pp. 677–681.
- p134 Visell, Y., Hayward, V. 2013. An Asymmetry In Force Perception Contingent On Motion Reversal. *Proceedings of the IEEE World Haptics Conference*. pp. 651–656.
- p133 Farkhatdinov, I., Hayward, V., Berthoz, A., Michalska, H. 2012. Modeling Verticality Estimation During Locomotion. *Proceedings of the 19th CISM-IFTOMM Symposium on Robot Design, Dynamics, and Control*, *Proceedings of the 19th CISM-IFTOMM Symposium*. pp. 359–366.
- p132 Berrezag, A. Visell, Y. Hayward, V. 2012. Compressibility and Crushability Reproduction Through an Amorphous Haptic Interface. *Proceedings of Eurohaptics 2012*, LNCS 7283, Part II, pp. 186–190.
- p131 Okazaki, R., Kajimoto, H., Hayward, V. 2012. Vibrotactile Stimulation Can Affect Auditory Loudness: A Pilot Study. *Proceedings of Eurohaptics 2012*. LNCS 7283, Part II, pp. 103–108.
- p130 Hudin, C., Lozada, J., Wiertelwski, M., Hayward, V. 2012. Tradeoffs In The Application of Time-Reversed Acoustics to Tactile Stimulation. *Proceedings of Eurohaptics 2012*, LNCS 7283, Part I, pp. 218–226. (Best Paper Honorable Mention)
- p129 Lévesque, V., Petit, G., Dufresne, A., and Hayward, V. 2012. Adaptive Level of Detail in Dynamic, Refreshable Tactile Graphics. *Proceedings of the Haptics Symposium 2012*. pp. 1–5.
- p128 Farkhatdinov, I., Hayward, V., Berthoz, A. 2011. On the Benefits of Head Stabilization with a View to Control Balance and Locomotion in Humanoids. *Proceedings of the 11th IEEE-RAS International Conference on Humanoid Robots*, pp. 147–152.
- p127 Cai, V., Bidaud, Ph., Hayward, V. and Gosselin, F. 2011. Self-adjusting, Isostatic Exoskeleton for The Human Knee Joint. *Proceedings of the 33rd Annual International Conference of the IEEE Engineering in Medicine and Biology Society, EMBC'11*, pp. 612–618.
- p126 Wiertelwski, M., Hudin, C., Hayward, V. 2011. On the 1/f noise and non-integer harmonic decay of the interaction of a finger sliding on flat and sinusoidal surfaces. *Proceedings of World Haptics Conference 2011*, pp. 25–30. (Nominated for Best Paper)
- p125 Wexler, M. and Hayward V. 2011. Weak spatial constancy in touch. *Proceedings of World Haptics Conference 2011*, pp. 605–607.
- p124 Sinclair, S., Wanderley, M., Hayward, V., Scavone, G. Noise-free haptic interaction with a bowed-string acoustic model. *Proceedings of World Haptics Conference 2011*, pp. 463–468.
- p123 Pasquero, J. and Hayward, V. 2011. Tactile Feedback Can Assist Vision in Mobile Interaction. *Proceedings of CHI 2011, the International Conference on Human Factors in Computing Systems*, pp. 3277–3280.
- p122 Turchet, L., Nordahl, R., Serafin, S., Berrezag, A., Dimitrov, S., and Hayward, V. 2010. Audio-haptic physically-based simulation of walking on different grounds. *Proceedings of the 2010 the IEEE International Workshop on Multimedia Signal Processing, MMSP'10*, pp. 269–273 (4th in the Top 10% Paper Award)
- p121 Wiertelwski, M., Lozada, L., Pissaloux, E., Hayward, V. 2010. Tactile interface for stimulation of fingertip via lateral traction. *Proceedings of Actuators 2010, the 12th International Conference on New Actuators*, pp. 520–523
- p120 Lévesque, V. and Hayward, V. 2010. Laterotactile Rendering of Vector Graphics with the Stroke Pattern, *Proceedings of Eurohaptics 2010, Part II*, Kappers, A.M.L. et al. (Eds.), LNCS 6192, Springer-Verlag, pp. 25–30
- p119 Nordahl, R., Berrezag, A., Dimitrov, S., Turchet, L., Hayward, V. Serafin, S. 2010. Preliminary Experiment Combining Virtual Reality Haptic Shoes And Audio Synthesis, *Proceedings of Eurohaptics 2010, Part II*, Kappers, A.M.L. et al. (Eds.), LNCS 6192, Springer-Verlag, pp. 123–129
- p118 Wiertelwski, M., Lozada, J., Pissaloux, E., and Hayward, V. 2010. Causality Inversion in the Reproduction of Roughness. *Proceedings of Eurohaptics 2010, Part II*, Kappers, A.M.L. et al. (Eds.), LNCS 6192, Springer-Verlag, pp. 17–24 (Best Paper Award)
- p117 Cai, D., Bru, B., Bidaud, P., Hayward, V., and Pasqui, V. 2010. Experimental Evaluation of a Goniometer For the Identification of Anatomical Joint Motions. *Proceedings of the Thirteenth International Conference on Climbing and Walking Robots and the Support Technologies for Mobile Machines, CLAWAR 2010*.
- p116 Cai, D., Bidaud, P., Hayward, V., and Gosselin, F. 2010. Estimation of Complex Anatomical Joint Motions Using a Spatial Goniometer. *Proceedings of the 18th CISM-IFTOMM Symposium on Robot Design, Dynamics, and Control*,

ROMANSY 2010, pp. 399-406.

- p115 Cai, D., Bidaud, P., Hayward, V., and Gosselin, F. 2009. Design of Self-Adjusting Orthoses For Rehabilitation, Proceedings of the *14th IASTED International Conference Robotics and Applications*, pp. 215–223
- p114 Hayward, V. and Michalska, H. 2009. On Signum Feedback Stabilization of Second and Third-Order Systems. Proceedings of the *48th IEEE Conference on Decision and Control*, pp. 367–372
- p113 Xinjilefu, X., Hayward, V. and Michalska, H. 2009. Stabilization Of The Spatial Double Inverted Pendulum Using Stochastic Programming Seen As a Model of Standing Postural Control. Proceedings of the *9th IEEE-RAS International Conference on Humanoid Robots (Humanoids'09)*, pp. 367–372
- p110 Michalska, H. and Hayward, V. 2009. Quantized and Sampled Control of Linear Second Order Systems. Proceedings of the *European Control Conference 2009*, pp. 531–536
- p112 Konkle, T., Wang, Q., Hayward, V., Moore, C.I. 2009. Motion aftereffects transfer between touch and vision. *10th International Multisensory Research Forum*, New-York City, NY, July 2009 (Poster)
- p111 Frissen, I., Ziat, M., Champion, G., Hayward, V., Guastavino, C. 2009. Auditory-tactile temporal order judgments during active exploration. *10th International Multisensory Research Forum*, New-York City, NY, July 2009 (Poster)
- p108 Millet, G., Haliyo, S., Régnier, S., Hayward, V. 2009. The ultimate haptic device: First step. *Proceedings of the WorldHaptics Conference*, pp. 273–278
- p110 Petit, G., Dufresne, A., Levesque, V., Hayward V., Trudeau, N. 2008. Graphisme tactile appliqué aux illustrations de manuels scolaires à l'usage d'enfants ayant une déficience visuelle. Actes de *Interaction Homme-Machine 2008*
- p109 Petit, G., Dufresne, A., Levesque, V., Hayward, V., Trudeau, N., 2008. Refreshable tactile graphics applied to school-book illustrations for students with visual impairment, Proceedings of the *10th international ACM SIGACCESS conference on Computers and accessibility*, ASSETS'08 pp. 89–96
- p108 Azar, T. and Hayward, V. 2008. Estimation of the Fracture Toughness of Soft Tissue From Needle Insertion. Proceedings of the *4th International Symposium on Biomedical Simulation*, ISBMS 2008, Bello, F. and Edwards, E. (Eds.) Lecture Notes in Computer Science, Vol. 5104, Springer Verlag, pp. 166–175
- p107 Lévesque, V., Hayward V., Petit G., Dufresne A. 2008. Refreshable tactile graphics using a lateral skin deformation device. Abstract selected for oral presentation, *9th International Conference on Low Vision*
- p106 Wijntjes, M. W. A., Sato, A., Kappers, A. M. L. and Hayward V. 2008. Haptic Perception of Real and Virtual Curvature. Proceedings of *Eurohaptics 2008*, LNCS 5024, Springer-Verlag, pp. 361–366.
- p105 Nakatani, M., Sato, A., Tachi, S. and Hayward, V. 2008. Tactile Illusion Caused by Tangential Skin Strain and Analysis In Terms of Skin Deformation. Proceedings of *Eurohaptics 2008*, LNCS 5024, Springer-Verlag, pp. 229–237
- p104 Champion, G., Gosline, A. H., and Hayward, V. 2008b. Does Judgement of Haptic Virtual Texture Roughness Scale Monotonically With Lateral Force Modulation? Proceedings of *Eurohaptics 2008*, LNCS 5024, Springer-Verlag, pp. 718–723
- p103 Lévesque, V. and Hayward, V. 2008. Tactile Graphics Rendering Using Three Laterotactile Drawing Primitives. Proceedings of the *Symposium on Haptic Interfaces For Virtual Environments And Teleoperator Systems*, pp. 429–436
- p102 Champion, G., Gosline, A. H. and Hayward, V. 2008a. Passive Viscous Haptic Textures. Proceedings of the *Symposium on Haptic Interfaces For Virtual Environments And Teleoperator Systems*, pp. 379–380
- p101 Carter, O., Konkle, T., Snyder, J., Wang, Q., Hayward, V., Moore, C. and Nakayama, K. 2007. Bi-stable tactile stimulus shows perceptual rivalry exists across the senses. *8th International Multisensory Research Forum* (Poster)
- p100 Yao, H.-Y., Hayward, V., Cruz, M., Grant, D. 2007. The Effect of Weight on the Perception of Vibrotactile Intensity with Handheld Devices. Proceedings of *WorldHaptics Conference*. pp. 551–552.
- p99 Gosline, A. H. and Hayward, V. 2007. Time-Domain Passivity Control of Haptic Interfaces with Tunable Damping Hardware. Proc. *WorldHaptics Conference*. pp. 164–169
- p98 Lévesque, V., Pasquero, J., and Hayward, V. 2007. Braille Display by Lateral Skin Deformation with the STRESS2 Tactile Transducer. Proc. *WorldHaptics Conference*. pp. 115–120.
- p97 Wang, Q., Kong, L., Sprigle, S., Hayward, V. 2006. Portable Gage for Pressure Ulcer Detection. Proceedings of the *IEEE Engineering in Medicine and Biology Society Conference*, EMBC06, pp. 5997–6000.
- p96 Hayward, V. 2006. Haptic Synthesis. Proceedings of *SYROCO 2006, 8th International IFAC Symposium on Robot Control*, pp. 19–24 (Keynote Paper)
- p95 Yao, H.-Y. and Hayward, V. 2006. An Experiment on Length Perception with a Virtual Rolling Stone. Proceedings of *Eurohaptics 2006*. pp. 325–330. (Best Demonstration Award)
- p94 Gosline, A. H., Champion, G. and Hayward, V. 2006. On The Use of Eddy Current Brakes as Tunable, Fast Turn-On Viscous Dampers For Haptic Rendering. Proceedings of *Eurohaptics 2006*, pp. 229–234
- p93 Luk, J., Pasquero, J., Little, S., MacLean, K., Lévesque, V. and Hayward, V. 2006. A Role for Haptics in Mobile Interaction: Initial Design Using a Handheld Tactile Display Prototype. Proceedings of *CHI 2006, the International*

- Conference on Human Factors in Computing Systems*, pp. 171–180 (Best Paper Award)
- p92 Wang, Q., Lévesque, V., Pasquero, J., Hayward, V. 2006. A Haptic Memory Game using the STRESS2 Tactile Display. 2006. Interactive Abstract, Proceedings of *CHI 2006 International Conference on Human Factors in Computing Systems*, pp. 272–274
- p91 Yao, H.-Y. and Hayward, V. 2006. A Network-ready Multi-lateral High Fidelity Haptic Probe. Proceedings of *14th Symposium on Haptic Interfaces For Virtual Environment And Teleoperator Systems*, IEEE VR 2006, pp. 81–82
- p90 Wang, Q. and Hayward, V. 2006. Compact, Portable, Modular, High-performance, Distributed Tactile Transducer Device Based on Lateral Skin Deformation. Proc. 14th Symposium on Haptic Interfaces For Virtual Environment And Teleoperator Systems IEEE VR 2006, pp. 67–72 (Best Paper Award)
- p89 Campion, G., Gosline, A. H. and Hayward, V. 2006. Initial results using Eddy Current Brakes as Fast Turn-on, Programmable Physical Dampers for Haptic Rendering. Proceedings of the *14th Symposium on Haptic Interfaces For Virtual Environment And Teleoperator Systems*, IEEE VR 2006, pp. 73–74
- p88 Campion, G., Wang, Q., Hayward, V. 2005. The Pantograph Mk-II: A Haptic Instrument. Proceedings of *IROS 2005, IEEE/RSJ International Conference on Intelligent Robots and Systems*, pp. 723–728
- p87 Campion, G., Hayward, V. 2005. Fundamental Limits in The Rendering of Virtual Haptic Textures. Proceedings of the *WorldHaptics Conference*, pp. 263–270
- p86 Yao, H.-Y., Hayward, V., Ellis, R. E. 2004. A Tactile Magnification Instrument for Minimally Invasive Surgery. Proceedings of *MICCAI 2004*, C. Barillot, D.R. Haynor, and P. Hellier (Eds.), LNCS 3217, pp. 89–96, Springer-Verlag: Heidelberg
- p85 Garroway, D. and Hayward, V. 2004. A Haptic Interface for Editing Space Trajectories. Proceedings of *ACM SIG-GRAPH & EuroGraphics Symposium on Computer Animation*. (Poster)
- p84 Hayward, V. 2004. Display of Haptic Shape at Multiple Scales. Proceedings of *Eurohaptics 2004*, pp. 20–27 (Keynote paper)
- p83 Pasquero, J., Lévesque, V. Hayward, V., Legault, M. 2004. Display of Virtual Braille Dots by Lateral Skin Deformation: A Pilot Study. Proceedings of *Eurohaptics 2004*, pp. 96–103,
- p82 Pasquero, J., Hayward, V. 2003. STReSS: A Practical Tactile Display System with One Millimeter Spatial Resolution and 700 Hz Refresh Rate. Proceedings of *Eurohaptics 2003*, pp. 94–110
- p81 Lévesque, V., Hayward, V. 2003. Experimental Evidence of Lateral Skin Strain During Tactile Exploration. Proceedings of *Eurohaptics 2003*, pp. 261–275
- p80 Mahvash, M., Hayward, V. 2003. Passivity-based high-fidelity based haptic rendering of contact. Proceedings of the *IEEE International Conference on Robotics and Automation*, pp. 3722–3728
- p79 Yi, D., and Hayward, V., 2002. Augmenting Computer Graphics with Haptics for the Visualization of Vessel Networks. Proceedings of the *10th Pacific Conference on Computer Graphics and Applications* (PG 2002), pp 375–384
- p77 Yi, D., and Hayward, V., 2002. Linear Cost Reconstruction of Vascular Trees From Intensity Volume Angiograms. Proceedings of the *2nd International Conference on Image and Graphics* (ICIG 2002), SPIE. pp. 195–200.
- p76 Mahvash, M., Hayward, V., Lloyd, J. E. 2002. Haptic Rendering of Tool Contact. Proceedings of *Eurohaptics*, pp. 110–115.,
- p75 Hayward, V. 2001. Survey of Haptic Interface Research at McGill University. Proceedings of the *Workshop on Advances in Interactive Multimodal Telepresence Systems*, Hieronymus Buchreproduktions GmbH. pp. 91–98, (Plenary Talk)
- p74 Dupuis, E., Papadopolous, E., Hayward, V. 2001. The Singular Vector Algorithm For the Computation of Rank Deficiency Loci of Redundant Manipulators. Proceedings of the *IEEE/RSJ International Conference on Intelligent Robots and Systems* (IROS 2001), pp. 324–329
- p73 Astley, O. R., Hayward V. 2000. Design Constraints for haptic surgery simulation. Proceedings of the *IEEE International Conference on Robotics and Automation*. pp. 2446–2451
- p72 Boulet, B., Hayward, V. Robust Control of a Robot Joint with Actuator Redundancy. Proceedings of the *31st International Symposium on Robotics* (ISR 2000), pp. 36–41
- p71 Dupont, P. E., Armstrong, B., Hayward V. 2000. Elastic-plastic Friction Model: Contact Compliance and Stiction, Proceedings of the *IEEE American Control Conference*, pp. 1072–1077
- p70 Robles De La Torre, G., Hayward, V. 2000. Illusory Surfaces and Haptic Shape Perception. Proceedings of the *Symposium on Haptic Interfaces for Virtual Environments and Teleoperator Systems*, ASME Vol. DSC-69-2, pp. 1081–1087
- p69 Hayward V., Cruz-Hernandez, J. M. 2000. Tactile Display Device Using Distributed Lateral Skin Stretch. Proceedings of the *Symposium on Haptic Interfaces for Virtual Environments and Teleoperator Systems*, ASME Vol. DSC-69-2, pp. 1309–1314

- p68 Grant, D., Hayward V. 2000. Constrained Force Control of Shape Memory Alloy Actuators. Proceedings of the *IEEE International Conference on Robotics and Automation*. pp. 1320–2451.
- p67 Lessard, L., Hayward, V., Roy, M. M. 1998. Design and Fabrication of a Graphite/epoxy Link for a Lightweight Robotic Manipulator. Proceedings of the *European Conference on Composite Materials*.
- p66 Astley, O. R., Hayward, V. 1998. Multirate Haptic Himulation Achieved by Coupling Finite Element Meshes Through Norton Equivalents. Proceedings of the *IEEE International Conference on Robotic and Automation*, pp. 989–994
- p65 Cruz-Hernandez, J. M., Hayward, V. 1998. An Approach to Reduction of Hysteresis in Smart Materials. Proc. IEEE Int. Conf. on Robotics and Automation, pp. 1510–1515
- p64 Lloyd, J. E., Hayward, V., 1998. Generating Robust Trajectories in the Presense of All Kinematic Singularities. Proceedings of the *IEEE International Conference on Robotic and Automation*, pp. 3228–3234
- p63 Cruz-Hernandez, J. M., Hayward, V. 1998. Reduction of Major and Minor Hysteresis Loops in a Piezoelectric Actuator. Proceedings of the *IEEE Decision and Control Conference*, pp. 4320–4325.
- p62 Hayward, V. Grant, D. 1998. Vibration Isolation with High Strain Shape Memory Actuators. (Invited) Proceedings of the Innovation in Industrial Actuator Design, AM-15A, the *Inter. Mech. Eng. Congress and Exposition*.
- p61 Grant, D., Hayward, V. 1997. Controller for a High Gain Shape Memory Alloy Actuator. Proceedings of the *IEEE International Conference On Robotics and Automation*. Vol. 1, pp 254–259.
- p60 Astley, O. R., Hayward, V. 1997. An Experimental Procedure for Autonomous Joint Sensor Estimation Using Adaptive Control. Proceedings of the IEEE International Conference on Robotics and Automation. Vol. 2, pp. 1743–1748.
- p59 Joly, L. D., Andriot, C., Hayward, V. 1997. Mechanical Analogies in Hybrid Position/force Control. Proceedings of the *IEEE International Conference on Robotics and Automation*. Vol. 1, pp. 835–839.
- p58 Hayward, V., Janabi-Sharifi, F., Chen, C.-S. J. 1997. Adaptive Windowing Discrete-time Velocity Estimation Techniques: Application to Haptic Interfaces. Proceedings of the *Symposium on Robot Control*. SY.RO.CO'97, IFAC. pp. 465–472.
- p57 McDougal, J., Lessard, L. B., Hayward, V. 1997. Applications of Advanced Materials to Robotic Design: the Freedom-7 Haptic Hand Controller. Proceedings of the *Eleventh International Conference on Composite Materials*, ICCM-11.
- p56 Dong, C. J., Swindale, N. V., Zakarauskas, P., Hayward, V., Cynader, M. S. 1997. Auditory motion After-effect and its Position-transfer Characteristics. Proceedings of the *134th Meeting of the Acoustical Society of America*.
- p54 Astley, O. R., Hayward, V. 1997. Real-time Finite-elements Simulation of General Visco-elastic Materials for Haptic Presentation. Invited paper, Workshop on Dynamic Simulation: Methods and Applications. Proceedings of the *IEEE/RSJ International Conference on Intelligent Robotics and Systems*. IROS'97, pp. 52–57.
- p54 Cruz-Hernandez, J. M., Hayward, V. 1997. On the Linear Compensation of Hysteresis. Proceedings of the *IEEE Decision and Control Conference*. pp. 1956–1962.
- p53 Lu, X., Grant, D., Hayward, V. 1997. Design and Comparison of High Strain Shape Memory Actuators. Proc. *IEEE International Conference on Robotics and Automation*. Vol. 1, pp 260–267.
- p52 Payette, J. Hayward, V., Ramstein, C., Bergeron, D. 1996. Evaluation of a Force-feedback (Haptic) Computer Pointing Device in Zero Gravity. Proceedings of the *Fifth Annual Symposium on Haptic Interfaces for Virtual Environments and Teleoperation Systems*, ASME DSC-Vol. 58. pp. 547–553.
- p51 Lloyd, J. E., Hayward, V. 1996. A Discrete Algorithm for Fixed-path Trajectory Generation at Kinematic Singularities. Proceedings of the *IEEE International Conference on Robotics and Automation*, pp. 2743–2748.
- p50 Astley, O. R., Hayward, V. 1995. Automatic joint calibration using gravity as an invariant. Proceedings of the *Robotics and Knowledge Based Systems Workshop*, Canadian Space Agency, St. Hubert, Qc.
- p49 Hayward, V. 1995. Toward a seven axis haptic interface. Proceedings of the *IEEE/RSJ International Conference on Intelligent Robotics and Systems*. IROS'95, IEEE Press, Vol. 2, pp. 133–139.
- p48 Grant, D., Hayward, V. 1995. Design of High Strain Shape Memory Actuator under Variable Structure Control. Proceedings of the IEEE International Conference on Robotics and Automation. pp. 2305–2312.
- p47 Aubry, S., Hayward, V. 1995. Three dimensional model construction from multiple sensor view points. Proceedings of the *IEEE International Conference on Robotics and Automation*. pp. 2054–2059.
- p46 Mougnet, J.-F., Hayward, V. 1995. Limit cycle characterization, existence and quenching in the control of high Performance hydraulic actuator. Proceedings of the *IEEE International Conference on Robotics and Automation*. pp. 2218–2223.
- p45 Baron, T., Levine, M. L., Hayward, V., Bolduc, M., Grant, D. 1994. A Biologically-motivated Robot Eye System. Proceedings of the *8th Canadian Astronautics and Space Institute Annual Conference*. CASI, pp. 231–240. (Best Paper Award)
- p44 Payette, J., Gerard, C., Hayward, V., De Mori, R. 1994. An Experiment In Robot Operator Control Via Spontaneous Voice Interaction. Proceedings of the *Int. Advanced Robotics Programme, Second workshop on Space Robotics*.

- p43 Doyon, M., Hayward, V., Pelletier, M. 1994. Decentralized Impedance Control. Proceedings of the *Symposium on Robot Control SYROCO'94*, IFAC. 2:389–394.
- p42 Ramstein, C. Hayward, V. 1994. The Pantograph: a Large Workspace Haptic Device for a Multi-modal Human-Computer Interaction. Proceedings of the *Conference on Human Factors in Computing Systems, CHI'94 ACM/SIGCHI Companion-4/94*. pp. 57–58.
- p41 Becker, M., Hayward, V. Ranjbaran, F., Angeles, J., 1994. The Kinematics of a Parallel Wrist with Actuator Redundancy. Proceedings of the *International Symposium on Robotics and Manufacturing, ISRAM'94*.
- p40 Nahvi, A. Hollerbach, J. M., Hayward, V. 1994. Calibration of a Parallel Robot Using Multiple Loops. Proceedings of the *IEEE International Conference on Robotics and Automation*. pp. 407–413.
- p39 Lloyd, J. E., Hayward, V. 1993. Singularity Control of Robot Manipulators Using Closed-form Kinematic Solutions. Proc. Canadian Conf. on Electrical and Computer Engineering. pp. 1065–1068.
- p38 Ghallab, Y., Hayward V. 1992. Experimental Results with the Dynamic Urgency Algorithm. Proceedings of the *IEEE International Conference on Robotics and Automation*. pp. 547–553.
- p37 Hayward, V., Aubry S. 1991. Building Solid Models from Discrete Boundary Data. Proceedings of the *Second SIAM Conference on Geometric Design*.
- p36 Hayward, V. 1991. Aspects of the Control of Complex Mechanical Systems with Time-varying Topologies. Proceedings of the *8th World Congress on the Theory of Machines and Mechanisms, IFToMM*. pp. 639–643.
- p35 Kurtz, R., Hayward, V. 1991. Dexterity Measures for Tendon Actuated Parallel Mechanisms. Proceedings of the *International Conference on Advanced Robotics, ICAR*, pp. 1141–1148.
- p34 Lloyd, J. E., Hayward, V. 1991. Real-time Trajectory Generation using Blend Functions. Proceedings of the *IEEE International Conference on Robotics and Automation*. pp. 784–789.
- p33 Boyer, M., Daneshmend, L. K., Hayward, V., Foisy, A. 1991. An Object Oriented Paradigm for the Design and Implementation of Robot Planning and Programming Systems. Proceedings of the *IEEE International Conference on Robotics and Automation*. pp. 204–208.
- p32 Hayward, V., Daneshmend, L. K., Foisy, A., Boyer, M., Demers, L. P., Ravindran, R., Ng, T. 1990. The Evolutionary Design of MCPL, the MSS Command and Programming Language, Proceedings of the *IEEE/RSJ International Conference on Intelligent Robots and Systems, IROS'90*. pp. 413–419.
- p31 Foisy, A., Hayward, V., Aubry, S. 1990. The use of “Awareness” in Collision Prediction. Proceedings of the *IEEE Int Conference on Robotics and Automation*, pp. 338–343.
- p30 Pelletier, M., Hayward V. 1989. SUPER-GRIP: An Expert System for Grasping Boxes. Proceedings of the *IEEE International Conference on Systems Man and Cybernetics*. pp. 510–515.
- p29 Hayward, V. 1989. A Translation in Artificial Terms of the Design of Biological Manipulators. Proceedings of the *11th Annual Conference of the IEEE Engineering in Medicine and Biology Society*. pp. 898–899.
- p28 Aubry, S., Hayward V. 1989. Aggregation of Boundary Points into Solid Models. Proceedings of the *IEEE International Conference on Robotics and Automation*. pp. 196–201.
- p27 Hayward, V., Daneshmend, L. K., Hayati, S. 1989. An Overview of Kali: a System to Program and Control Cooperative Manipulators. Proceedings of the *Fourth International Conference on Advanced Robotics*. pp. 547–558.
- p26 Hayward, V., Kurtz, R. 1989. Preliminary Study of Serial-parallel Redundant Manipulator. Proceedings of the *NASA Conference on Space Telerobotics*. JPL Publication 89-7, pp. 39–48.
- p25 Backes, P., Hayati, S., Hayward, V., Tso, Kam. 1989. The Kali multi-arm robot programming and control environment. Proceedings of the *NASA Conference on Space Telerobotics*. JPL Publication 89-7, pp. 173–182.
- p24 Albaharna, O.T., Fraser, K.L., Hayward, V. 1988. A Bit-Serial Floating-point Multiplier-Accumulator for Massively Parallel Computing Structures. Proceedings of the *Canadian Conference on Very Large Scale Integration*. pp. 253–261.
- p23 Daneshmend, L., Hayward, V., Girard, P., Boyer, M. 1988. Telerobotic Maintenance of Power Lines. Proceedings of the *IARP Second Workshop on Manipulators, Sensors, and Steps toward Mobility*.
- p22 Topper, A., Daneshmend, L., Hayward, V. 1988. A Computing Architecture for a Multiple Robot Controller for Space Applications (Kali project). Proceedings of the *Fifth CASI Conference on Astronautics*.
- p21 Aubry S., Hayward V. 1988, Aggregation of Sets of Boundary Points. Proceedings of the *SPIE Conference, Sensor Fusion: Spatial Reasoning and Scene Interpretation*. pp. 83–96.
- p20 Hayward, V., Daneshmend, L., Nilakantan, A. 1988. Model Based Trajectory Planning Using Preview. Proceedings of the *SPIE Conference, Space Automation IV*. pp. 186–193.
- p19 Hayward, V. 1988. Autonomous Control Issues in a Telerobot. Proceedings of the *IEEE International Conference on Systems Man and Cybernetics*. Workshop on Manipulators in Space. pp. 122–125.
- p18 Hayward, V., Hayati, S. 1988. Kali: An Environment for the Programming and Control of Cooperative Manipulators.

Proceedings of the *American Control Conference*. 473–478.

- p17 Nilakantan, A., Hayward V. 1988. Synchronizing multiple manipulators. Proceedings of the *Robotics and Manufacturing, Recent Trends in Research, Education, Applications*. ASME Press. pp. 381–389.
- p16 Daneshmend, L., Hayward, V. 1988. Adaptation in the control of multiple coordinated manipulators. Proceedings of the *Robotics and Manufacturing, Recent Trends in Research, Education, and Applications*. ASME Press. pp. 219–226.
- p15 Aubry, A., Hayward, V., 1987. Recursive decomposition of free-space from boundary points. Proceedings of the *Workshop on Spatial Reasoning and Multi-Sensor Fusion*. A. Kak. Su-shing Chen (Eds.) Morgan Kaufman. pp. 128–138.
- p14 Hayward, V., Hayati, S. 1987. Design Principles of a Cooperative Robot Controller. Proceedings of the *Space Station Automation III, Advances in Intelligent Robotics Systems*, SPIE. pp. 135–140.
- p13 Hayward, V., Aubry, S. 1987. On describing a robotic scene. Proceedings of the *Intelligent Robots and Computer Vision: Sixth in a Series, Advances in Intelligent Robotics Systems*, SPIE. pp. 525–532.
- p12 Izaguirre, A., Hashimoto, M., Paul, R. P., Hayward, V. 1987. A new computational structure for real-time dynamics. Proceedings of the *IEEE International Workshop on Robotics Trends, Technology and Applications*.
- p11 Aubry, S., Hayward, V. 1987. Tetrahedral Recursive Decomposition of Free Space From Boundary Points. Proceedings of the *SIAM Conference On Applied Geometry*.
- p10 Aubry, S., Hayward, V. 1987. Range Image Analysis Using Level Curves. Proceedings of the *Scandinavian Conference on Image Analysis*.
- p09 Hayward, V., Aubry, A., Jasiukajc, Z. 1987. The Use of 3D Sensing Techniques for On-line Collision-Free Path Planning. Proceedings of the *Jet Propulsion Laboratory/NASA workshop on Space Robotics*. pp. 119–124.
- p08 Lee, J. S., Hayati, S., Hayward, V., Lloyd, J. E., 1986. Implementation of Robot Control C Library on the Micro Vax II. Proceedings of the *Advances in Intelligent Robotics Systems, SPIE's Cambridge Symposium on Optical and Optoelectronic Engineering*.
- p07 Hayward, V., 1986. A Fast Collision Detection Scheme by Recursive Decomposition of a Manipulator Workspace. *IEEE International Third Conference on Robotics*. pp. 1044–1049.
- p06 Hayward, V., Paul, R. P., 1984. Robot Control and Computer Languages. Proceedings of the *Fifth CISM-IFTOMM Symposium on Theory and Practice of Robot Manipulators*.
- p05 Hayward, V., Paul, R. P., 1984. Introduction to RCCL: A Robot Control 'C' Library. Proceedings of the *First IEEE Int Conference on Robotics*. pp. 293–298.
- p04 Hayward, V., Paul, R. P., 1983. Robot Manipulator Control Under Unix. Proceedings of the *Thirteenth International Symposium on Industrial Robots*.
- p03 Paul, R. P., Luh, J. Y. S., Hayward, V., and Nof, S. Y. 1983. Advanced Industrial Robot Control Systems. Proceedings of the *NSF Tenth Conference on Production Research and Technology*.
- p02 Hayward, V., 1982. A system to Automatically Analyze Assembled Programs from Machine Descriptions. Proceedings of the *IFAC Symposium on Computer Aided Design of Multivariable Technological Systems*.
- p01 Hayward, V., Osorio, A., 1981. Automatic Retrieval of Semantic Actions Performed by Machine Code Sequences. Proceedings of the *ACM Computer Science Conference*.

5.1.4 Patents

- q34 WO 2017,055,375, application 06 April 2017. High-fidelity haptic device. Vincent Hayward, Stéphane Regnier, Duflos Antoine Weill, Guillaume Millet.
- q33 US 9,436,284, granted 6th September 2016. Time-reversal tactile stimulation interface, Charles Hudin, Vincent Hayward, José Lozada, Michaël Wiertelwski.
- q32 US 9,298,259, granted 29th March 2016. System for simulating a contact with a surface by tactile simulation, Michaël Wiertelwski, Vincent Hayward, José Lozada.
- q31 FR 2994751, granted 25th March 2016. A tactile feedback figurine cooperating with an application. Jean Etienne Mineur, Bertrand Duplat, Vincent Hayward.
- q30 FR 3035525, Pending 23th April 2015. Method for simulation of a displacement of a virtual button and device associates. Vincent Hayward, Alexander Terekhov.
- q29 FR 3003363, 13th March 2015. Pawn propelled pilot distance displacement locates on capacitive screen of digital tablet. Bertrand Duplat, Jean Etienne Mineur, Vincent Hayward, Guillaume Millet.
- q28 US 8,803,460, granted 12th August 2014. Device for quickly generating a torque on an extended dynamic range with low inertia. Guillaume Millet, Vincent Hayward, Dogan Sinan Haliyo, Stéphane Regnier.
- q27 US 8,016,818, granted 13th September 2011. Tactile amplification instrument and method of use, Ellis Randy E,

Vincent Hayward, Hsin-Yun Yao.

- q26 US 2014,346,901, application 19th December 2011. Miniature linear vibrotactile actuator, Vincent Hayward, Amir Berrezag, George Dietz.
- q25 WO 2012,136,842, application 8th April 2011. Enclosure intended to be arranged in an everyday object subject to stress. Vincent Hayward, Amir Berrezag.
- q24 WO 2012,040,703 application 24th September 2010. White cane with integrated electronic travel aid using 3d tof sensor, Mesa Imaging Ag, Houston, J. Grant, Roger Gassert, Yeongmi Kim, Thierry Oggier, Markus Riesch, Mathias Deschler, Cornelia Prott, Stefan Schneller, Vincent Hayward.
- q23 US 8,095,706, granted 19th March 2009. Systems and methods for the analysis of mechanical properties of materials, Stephen Sprigle, Linghua Kong, Qi Wang, Vincent Hayward, Jayme Caspall.
- q22 US 7,567,243, granted 28th of July 2009. System and method for low power haptic feedback, Vincent Hayward.
- q21 US 7,369,115, granted 6th of May 2008. Haptic devices having multiple operational modes including at least one resonant mode, Immersion Corporation, Juan Manuel Cruz-Hernandez, Danny Grant, Vincent Hayward.
- q20 US 7,336,266, granted 26th of February 2008. Haptic pads for use with user-interface devices, Vincent Hayward, Ramon Alarcon, Louis B. Rosenberg.
- q19 CA 2,260,944, granted 21st November 2006. Hand controller, Pedro Gregorio, Vincent Hayward, Christophe Ramstein.
- q18 US 7,077,015, granted 18th July 2006. Apparatus to reproduce tactile sensations, Vincent Hayward, Pasquero Jerome, Vincent Levesque.
- q17 US 6,781,569, granted 24th August 2004. Hand controller, Immersion Corporation, Pedro Gregorio, Vincent Hayward, Christophe Ramstein.
- q16 US 2005010326, application 27th May 2004 abandoned. Method and apparatus for synthesizing virtual interaction between rigid and deformable bodies, Vincent Hayward, Mohsen Mahvash-Mohammadi.
- q15 US 6,693,516, granted 17th February 2004. Electro-mechanical transducer suitable for tactile display and article conveyance, Vincent Hayward.
- q14 CA 2430193, Application 28th May 2003 abandoned. Method and apparatus for synthesizing virtual interaction between rigid and deformable bodies, Vincent Hayward, Mohsen Mahvash Mohammadi.
- q13 US 6,445,284, granted 3rd of May 2002. Electro-mechanical transducer suitable for tactile display and article conveyance, Juan Manuel Cruz-Hernandez, Vincent Hayward.
- q12 WO 0060315, granted 12 October 2000. Differential displacement optical sensor, Pedro Gregorio, Vincent Hayward, Danny Grant.
- q11 US 6,116,844, granted 12th September 2000. Mechanisms for orienting and placing articles. Vincent Hayward.
- q10 WO 0046000, granted 10th August 2000. Hand controller, Pedro Gregorio, Vincent Hayward, Christophe Ramstein, Pedro Gregorio, Vincent Hayward, Christophe Ramstein.
- q09 US 6,020,967, granted 1st February 2000. Differential displacement optical sensor, Pedro Gregorio, Vincent Hayward, Danny Grant.
- q08 GB 2,347,199, granted 14th April 1999. A hand controller for cursor movement. Pedro Gregorio, Vincent Hayward, Christophe Ramstein.
- q07 US 5,727,391, granted 17th of March 1998. Deformable structural arrangement. Vincent Hayward, Danny Grant.
- q06 WO 9,636,462, granted 21st November 1996. Deformable structural arrangement. Vincent Hayward, Danny Grant.
- q05 CA 2218721, Application 17th May 1996 abandoned. Deformable structural arrangement Danny Grant, Vincent Hayward.
- q04 US 5,847,528, granted 8th of December 1995. Mechanism for control of position and orientation in three dimensions. Raymond Chung-Ying Hui, Vincent Hayward, Alain Gerard Ouellet, Walter Peruzzini, Pedro Gregorio, Andrew Wang, George Vukovich.
- q03 CA 2149849, application 19th May 1995 abandoned. Actuator, Vincent Hayward, Danny Grant.
- q02 CA 2121396, application 15th April 1994 abandoned. Mechanism for positioning articles, Vincent Hayward.
- q01 CA 2109276, application 26th October 1993 abandoned. Mechanisms for orienting and placing articles, Vincent Hayward, Fabienne Reynier.

5.1.5 Recent Invited Lectures

- 10/18 Departmental Lecture, School of Science and Technology, Nazarbayev University, Kazakhstan
- 10/18 Departmental Lecture, School of Engineering, University of Glasgow, Scotland, UK
- 09/18 Barcelona Cognition, Brain and Technology Summer School, Inst. for Bioeng. of Catalonia, UPC, Barcelona, Spain
- 08/18 Hand, Brain and Technology: the Somatosensory System Conference, Monte Verità, Ascona, Switzerland

06/18 Paris-Chicago Conference on Ambiguity of Neural Representations Mediating Perception, Paris, France

06/18 Space-Time Geometries and Movement in the Brain and in the Arts, Institut d'Études Avancées De Paris, France

03/18 Université Permanente, Université de Nantes, Nantes, France

12/17 Department of Physiology, Linköping University, Linköping, Sweden

12/17 Whitehead Lectures series, Departments of Psychology & Computing, Goldsmiths University, London, UK

11/17 Franco-Scottish Seminar: Robotics, The Royal Society of Edinburgh, Edinburgh, Scotland, UK

10/17 School of Electronic Engineering and Computer Science, Queen Mary University of London, London, UK

07/17 Imperial College London, Brain and Behaviour Lab, London, UK

07/17 Imperial College Centre for Engagement and Simulation Science (ICCESS), London, UK

03/17 Departmental Seminar, Universidade Federal de Minas Gerais, Belo Horizonte, Brazil

03/17 Trusting Our Senses: Metacognition and Confidence Across Sensory Modalities, ICPS 2017, Vienna, Austria

12/16 Departmental Seminar, School of Medical Sciences, University of New South Wales, Sydney, Australia

10/16 Bodily sensations and bodily awareness: building blocks of subjectivity, Institut des études Avancées, Paris, France

10/16 Brain and Cognition Seminar, Université de Genève, Switzerland

09/16 Workshop on Friction — boon or bane for tactile coding? Bernstein Conference, Berlin, Germany

09/16 Institut des Sciences du Mouvement, Etienne Jules Marey Marseille, France

09/16 ERC PATCH Closing Workshop on Computational Touch, Paris, France

08/16 Radboud Summer School On Maps In The Brain, Nijmegen, The Netherlands

07/16 NTT Communication Science Laboratories, Atsugi, Japan

07/16 Invited Symposium on Sensory Substitution, 31st International Congress of Psychology, Yokohama, Japan

07/16 Workshop on Human-robot Interaction, INRIA, Paris, France

07/16 Virtual Prototyping Summer School, Politecnico di Milano, Italy

07/16 Haptic illusions: challenge, chance or nuisance for applications?, Eurohaptics Workshop, London, UK

07/16 Musical haptics: use and relevance of haptic feedback in musical practice, Eurohaptics Workshop, London, UK

06/16 Current topics in perception and cognition, Department of Psychology Colloquium, Universität Gießen, Germany

06/16 Int. Workshop on Engineering of Bio-Inspired Materials, Leibniz Inst. for New Materials, Saarbrücken, Germany

03/16 Colloque "Sensorialité et handicap", Toucher pour apprendre, toucher pour communiquer, Cité des Sciences, Paris

11/15 Janelia Conference: Mammalian Circuits Underlying Somatosensation, Ashburn, Virginia, USA

11/15 Robotic Systems Laboratory LSRO Ecole Polytechnique Fédérale de Lausanne, Switzerland.

10/15 Cences, the Centre for the Study of the Senses, University of London, UK.

05/15 Google Research, Mountain View, CA, USA

05/15 Devices and Networking Summit 2015, MicroSoft Research, Paris, France.

05/15 L'Oréal Research and Innovation, Aulnay sous bois, France.

04/15 Dassault Systèmes. Vélizy Campus, France

10/14 Mini-symposium on touch. Institute of Neuroscience, Université Catholique de Louvain, Belgium.

09/14 Workshop on Active Touch Sensing in Animals and Robots, IROS 2014, Chicago, USA

09/14 Monte Verità Centro Stefano Franscini (CSF) Conference "Hand, Brain and Technology", Switzerland

07/14 Robotics Research Jam Sessions. University of Pisa, Italy

03/14 What role for the distinction between the senses? Institute of Philosophy, University of London, London, UK

02/14 Robotics Institute, Carnegie Mellon, University, Pittsburgh, PA, USA

02/14 Electrical and Computer Engineering, Drexel University, Philadelphia, PA, USA

02/14 Neuroscience and Robotics Lab at Northwestern University, Evanston, IL, USA

02/14 Computer Science and Artificial Intelligence Laboratory, Massachusetts Institute of Technology, Boston, MA, USA

02/14 Department of Biomedical Engineering, Columbia University, New York, NY, USA

11/13 IRIT, Université Paul Sabatier, Toulouse, France

11/13 Workshop on "Bio-inspired sensing for robotics", Inst. des Sciences du Mouvement E.-J. Marey, Marseille, France

11/13 School of Mechanical Engineering, Beihang University, Beijing, China

10/13 Journées Nationales de la Recherche en Robotique, Annecy, France

10/13 Exploratorium: Exploring Your Senses, Bloomsbury Festival 2013, London, UK

07/13 Interaction architecture, Apple Inc., Cupertino, CA, USA

07/13 Early Touch: From Neural Coding to Haptic Space Geometry, CNS*2013, Paris, France

07/13 Virtual Prototyping Summer School, Politecnico di Milano, Italy

06/13 12th Dutch Belgian Haptic Network Meeting, Katholieke Universiteit Leuven, Belgium

05/13 Conference on The World Inside The Brain, School of Psychology, University of Birmingham, UK

05/13 Workshop on Hand synergies — how to tame the complexity of grasping, IEEE ICRA 2013, Karlsruhe, Germany

01/13 Institute of Philosophy, University of London's School of Advanced Study, London, UK

01/13 Service de Psychiatrie de l'enfant et de l'adolescent, CHU Pitié-Salpêtrière, Paris, France

01/13 Integrative, Multisensory, Perception, Action and Cognition Team, INSERM (ImpAct), Lyon, France

11/12 Department of Cognitive Neuroscience & Cognitive Interaction Technology, Bielefeld Universität, Germany

10/12 Nokia Research Center, Espoo, Finland
 09/12 Department of Computer Science, University of Bristol, UK
 07/12 2012 Virtual Prototyping Summer School, Politecnico di Milano, Milan, Italy
 06/12 Multisensory Integration Meeting, University of Birmingham, UK
 06/12 ETH Summer School on Soft Robotics, Zurich, Switzerland
 05/12 2nd Workshop on Robotics and Neuroscience, University of Siena, Italy
 05/12 Next Generation Multimedia Research & Development Workshop, New York University Abu Dhabi Institute, UAE
 03/12 Laboratoire Interfaces Sensorielles, Commissariat à l'Energie Atomique, Fontenay-aux-roses, France
 03/12 Center for Intelligent Machines, McGill University, Montréal, Canada
 02/12 Journée d'étude PraTIC: Jouabilité, interactivité et cognition, l'école de l'image des Gobelins, Paris, France
 12/11 Department of Bioengineering, Imperial College London, UK
 11/11 Symposium on State of the Art and Future of Haptics, Nagoya Institute of Technology, Japan
 09/11 50th anniversary of the Institute of Automatic Control Engineering, Technical University of Munich, Germany
 07/11 Workshop on Multimodal and Sensorimotor Bionics Inst. for Adv. Study, Technical University of Munich, Germany
 06/11 Workshop on Vibrotactile Haptics for Touch Screens, World Haptics Conference 2011, Istanbul, Turkey
 06/11 Workshop on Haptics in Surgical Robotics, World Haptics Conference 2011, Istanbul, Turkey
 06/11 Institute for Infocomm Research, A*Star, Singapore
 05/11 DeViNT 2011: Neuvième journée Déficiants Visuels et Nouvelles Technologies, Polytech'Nice – Sophia, France
 04/11 INM - Leibniz-Institut für Neue Materialien, Saarbrücken, Germany
 04/11 Advanced Robotics Group, Italian Institute of Technology, Genova, Italy
 03/11 Laboratory of Cognitive Neuroscience, Brain Mind Institute, Ecole Polyt. Fédérale de Lausanne, Switzerland
 02/11 Theo Murphy Meeting on Active Touch Sensing, Kavli Royal Society International Center, Buckinghamshire, UK
 01/11 Institute for Robotics and Cognitive Systems, Department of Computer Science, Universität zu Lübeck, Germany
 01/11 European Master on Advanced Robotics (EMARO), Ecole Centrale de Nantes, France
 12/10 Department of Psychology, University of Sheffield, UK
 11/10 Institut de Recherche en Communications et Cybernétique de Nantes, IRCCYN, France
 10/10 Colloquium Polaris, Institut National de Recherche en Automatique et Informatique, INRIA Lille, France
 10/10 Int. Symposium "Scientific Computing for the Cognitive Sciences", IWH, University of Heidelberg, Germany
 09/10 2010 Virtual Prototyping Summer School, Politecnico di Milano, Milan, Italy
 04/10 Laval Virtual, Recent Advances In Haptic Interaction, Laval, France
 03/10 Institute for Neuroinformatics, University of Zürich (UZH), Switzerland
 01/10 Computer Vision Laboratory, Eidgenössische Technische Hochschule Zürich (ETHZ), Switzerland
 11/09 Laboratoire des Systèmes Robotiques, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland
 11/09 Institute of Robotics & Intelligent Systems, Eidgenössische Technische Hochschule Zürich (ETHZ), Switzerland
 09/09 Laboratoire d'acoustique musicale (LAM), Paris, France
 07/09 2009 Virtual Prototyping summer school, Politecnico di Milano, Milan, Italy
 04/09 Unité de Réadaptation et de Médecine Physique, Université Catholique de Louvain, Brussels, Belgium
 11/07 School of Physical and Occupational Therapy, Research Seminar Series, McGill University
 10/07 Département d'Informatique, Université du Québec à Montréal
 10/07 MCGovern Institute for Brain Research at MIT
 07/07 Institute of Robotics and Mechatronics, German Aerospace Center DLR, Wessling, Germany
 07/07 Laboratoire d'Automatique et d'Analyse des Systèmes, LAAS, Toulouse, France
 07/07 Touch Workshop, Department of Psychology, The University of Edinburgh, UK
 04/07 Department of Neuromotor Physiology, IRCCS Fondazione Santa Lucia, Rome, Italy
 04/07 Laboratoire de Physiologie de la Perception et de l'Action, Collège de France, Paris, France
 03/07 Behavioural Brain Sciences Centre, School of Psychology, University of Birmingham, UK
 03/07 Sonic Arts Research Center, Queen's University Belfast, Belfast, Ireland
 03/07 Department Physics of Man Helmholtz Institute, Utrecht University, The Netherlands
 03/07 Laboratoire « Psychologie et Neurocognition » Université Pierre Mendès France, Grenoble, France
 03/07 Max Planck Institute for Biological Cybernetics, Tübingen, Germany
 01/07 Institut de Recherche en Communications et en Cybernétique de Nantes, Nantes, France
 12/06 Delft Biorobotics Laboratory, University of Delft, The Netherlands
 12/06 Department of Electrical Engineering, University of Twente, The Netherlands
 11/06 Mechanical Engineering and Materials Science, Rice University, Houston, Texas, USA
 11/06 Tactile Research Group meeting. Annual Psychonomic Society Annual Meeting, Houston, Texas, USA
 10/06 COSTECH - Connaissance, Organisation et Systèmes Techniques, Univ. de Technologie de Compiègne, France
 10/06 Séminaire Romand de 3ième cycle d'Informatique, Université de Genève, Suisse
 09/06 Robotics and Systems Laboratory, University of Siena, Italy
 07/06 Workshop on Perception-based Haptic Rendering, Eurohaptics 2006, Paris, France

05/06 Guest Lecture. Experimental Haptics CS277. Stanford University
 04/06 Montréal Chapter of ACM SIGGRAPH, Canada
 03/06 Département d'Informatique, Université du Québec à Montréal, Canada
 03/06 Guest Lecture. Human Computer Interaction Course, ECE Department, McGill University, Canada
 10/05 Music Department, Brown University, USA
 10/05 Société des Arts Technologiques, Montréal, Canada
 10/05 Department of Mechanical Engineering, Concordia, University, Montreal, Canada
 08/05 Department of Computer Science, University of British Columbia, Vancouver, Canada
 03/05 Centre de Recherche en Neurosciences, Université Catholique de Louvain, Brusells, Belgium
 12/04 Eidgenössische Technische Hochschule Zürich (ETHZ), Switzerland, Mechatronics Seminars
 03/04 The University of British Columbia, Department of Surgery, Grand Rounds, Canada
 03/04 Journée Scientifique Internationale IRCICA, "Stimulateurs tactiles : Technologie et Usages"
 02/03 Visualization and Perceptualization Center, Purdue University, USA
 01/03 2003 Canadian Undergraduate Technology Conference, Toronto, Canada
 11/02 Institut Nazareth & Louis-Braille, Longueuil, Qc, Canada
 10/02 Colloque IMSI, Sherbrooke University, Canada
 09/02 Science Talks, Marianopolis College, Montréal, Qc, Canada
 07/02 Scuola Superiore di Studi Universari e di Perfezionamento Sant'Anna Pisa, Italy (short course)
 05/02 Center for Computer Research in Music and Acoustics (CCRMA) Stanford University, USA
 05/02 Defense R&D Canada-Toronto, Canada
 04/02 Workshop on Multimodal Interactions in Perception. J. K. O'Regan and J. Clark, Paris, France
 02/02 Guest Lecture - Music Technology, McGill University, Canada
 02/02 Université Laval, Québec, Canada
 06/01 Institute for Mathematics and Application Workshop: Haptics, Virtual Reality, and HCI, USA
 03/01 Max-Planck Institute, Tuebingen, Germany
 09/98 IRCAM, Paris, France
 03/98 INRIA Rhones-Alpes, Grenoble, France
 02/98 Ecole des Mines de Paris, February, 1998
 01/98 ARTS Lab., Scuola S. S. Anna, Pisa, Italy
 12/97 Human and Machine Haptics ONR Workshop, Asilomar, CA, USA

5.1.6 Technical Reports

- r22 Hayward, V., Levesque, V., Pasquéro, J. 2003 (December). Afficheur Braille Par Étirement Latéral, Phase I, INLB, Visuaide Inc., CRIR and CNIB.
- r21 Cruz-Hernandez, J. M., Hayward, V., Antoniu, E. 1998 (October). Hysteresis Model for the Altair Deformable Mirror, National Research Council Contract LP034-8-4117.
- r20 Hayward, V. 1996 (March). Design and Integration of DSM Force-Reflecting Mechanisms, Phase II Design of Prototype for Shuttle Experiment. Vol. I and II. (Interim), Contract 9F028-5-51128/01-XSD.
- r19 Hayward, V. 1996 (March). Phase IV- Design and Integration og DSM Force-Reflecting Mechanisms. Vol. I and II. Contract 9F028-4-3199/01-XSD. March 1996.
- r18 Hayward, V. 1994 (November). Development and Construction of a Miniature Hand Controller With Force and Tactile Feedback Capability. Vol. I and II. Contract 9F028-3-1476/01-XSD, November 1994.
- r17 Reynier, F., Hayward, V. 1992 (July) Final Report on the Feasibility Study for the Development of a Miniature Hand-Controller with Force and Tactile Feedback Capability. Canadian Space Agency, Space Research and Technology. Contract No. 9F009-1-1441/01-SR
- r16 Reynier, F., Hayward, V. 1992 (July) Feasibility Study for the Development of a Miniature Hand-Controller with Force and Tactile Feedback Capability: Characterization of the Human Upper Extremities. Canadian Space Agency, Space Research and Technology, Contract No. 9F009-1-1441/01-SR
- r15 Foisy, A., Hayward, V. 1992 (July). Final Report for the Development of a Collision-Free Motion Planning Technique for MCPL, the MSS command and programming language. Spar Aerospace Ltd., Remote Manipulator Systems Division, Contract No. 09021TF.
- r14 Hayward, V. 1991 (December). Second International Symposium on Experimental Robotics Final Report. Canadian Space Agency Contract No. 990-645R.
- r13 Daneshmend, L. K., Boyer, M., Hayward, V. 1990 (April). Task analysis decomposition and planning of an operational scenario for MCPL: the Mobile Servicing Station (MSS) Command and Programming Language: The attached payload servicing function. Spar Aerospace Limited.
- r12 Foisy, A., Hayward, V. Daneshmend, L.K. 1989 (December). Final Report on Advanced Collision-Free Motion Planning Methods for MCPL, the MSS Command and Programming Language. Spar Aerospace Limited.

- r11 Hayward, V. 1989 (November). Final Report on the First International Symposium on Experimental Robotics. National Research Council, Space Division.
- r10 Hayward, V. Daneshmend, L., Foisy, A., Demers, L.-P. 1988 (May). Final report on the technology development for the MSS command and programming language. Spar Aerospace Limited.
- r09 Hayward, V., Hayati, S. 1988 (Mars). Kali: An environment for the programming and control of cooperative manipulators. McGill Research Center for Intelligent Machines Technical Report, CIM-88-8, McGill University, Montréal, Canada. Also Jet Propulsion Laboratory Report.
- r08 Hayward, V., Daneshmend, L., Nilakantan, A. 1988 (Mars). Model based trajectory planning using preview. Jet Propulsion Laboratory Report.
- r07 Nilakantan, A., Hayward, V. 1988 (Mars). Synchronizing multiple manipulators. Jet Propulsion Laboratory Report.
- r06 Topper, A., Hayward, V. 1987 (July). Porting RCCL to a multiprocessor environment: requirements specification for hardware and real-time software. Jet Propulsion Laboratory Technical Report.
- r05 Hayward, V., Lloyd, J. E. 1986 (October). RCCL users's guide. McGill Research Center for Intelligent Machines Technical Report, CIM-86-4, McGill University, Montréal, Canada.
- r04 Hayward, V. 1983 (October). Introduction to RCCL: A robot control 'C' library. Purdue University Technical Report, TR-EE 83-43.
- r03 Hayward, V. 1983 (October). RCCL version 1.0 and related software source code. Purdue University Technical Report, TR-EE 83-47.
- r02 Hayward, V. 1983 (October). RCCL version 1.0 user's manual. Purdue University Technical Report, TR-EE 83-46.
- r01 Hayward, V. 1983 (October). Robot Real-Time Control User's Manual. Purdue University Technical Report, TR-EE 83-42.

5.1.7 Mention in the press (21st century only)

- 16/10/15 Le sens du toucher reproduit par un composant électronique — Le Figaro
- 19/03/15 Apple Haptic Tech Makes Way For Tomorrow Touchable UIS — Wired
- 17/02/14 Robotics lecture on fingertips and tactile function — The Tartan
- 01/01/14 EE Times
- 29/06/12 尝试一下！让你的触感产生错觉的七种方法 — China Daily
- 26/04/10 Putting the touch into touchscreens — The New Scientist
- 03/03/10 Touch Screens that Touch Back — MIT Tech Review
- 29/04/09 The touch of technology — McGill Reporter
- 12/04/09 How You Feel The World Impacts How You See It — Science Daily
- 11/03/09 Seven ways to fool your sense of touch — The New Scientist
- 26/10/08 Canadian researchers developing "touch vision" — The Toronto Star
- 25/10/08 Pinching display lets you feel the data — The New Scientist
- 28/10/08 Searching the frontiers of science — The Star
- 21/10/08 Touch Illusions — The Museum of Hoaxes
- 16/01/08 That freaky feeling — Science Squirrel Society China
- 14/02/08 Illusions of Touch: Some things to try on your valentine... — Scienceblogs.com
- 19/07/08 Perception: Scientists create touch illusion — A Level Psychology Resources
- 04/09/08 Execs predict next Google-like tech — CNET.com
- 04/09/08 Big Data: The next Google — Nature, Vol 455
- 30/04/04 Sci Tech Radio Canada International
- 14/07/07 Touch me, feel me — The Guardian
- 09/01/07 Virtual Braille opens employment doors for visually impaired — IT World Canada
- 08/03/07 How touching — The Economist
- 25/08/06 The Cutting Edge of Haptics — MIT Technological Reviews
- 14/07/06 Gadgets get the feel of the tactile world — The New Scientist
- 13/06/06 Sensor Has Human Touch, Discovery News
- 01/05/03 CBC Radio Interview
- 19/04/03 Workplace breakthroughs for the blind — The Toronto Star
- 06/03/03 Braille for computers — McGill Reporter
- 12/01/02 Sensational Devices — The Globe and Mail

30/06/01 Science Notebook — Washington Post
01/06/01 Fingers decipher by force, not topology — The National Post
26/07/01 Brain: Touchy Feely In A Virtual Hole — Alpha Galileo
04/10/01 La force au bout des doigts — Pour la Science
10/03/01 Feel it in your fingers — The New Scientist

5.2 Research Grants and Contracts

5.2.1 Current

2019–22 *Predictive Haptic Coding Devices in Next Generation Interfaces* (PH-Coding). H. Jörntell (Coordinator), E. Burdet, R. Dahiya, V. Hayward (PIs), H2020 Research and Innovation action, FET Open project, 225,000 €/year of 1,000,000 €/year.
2018–21 *Mixed Haptic Feedback for Mid-Air Interactions in Virtual and Augmented Realities* (H-Reality). M. J. Adams (Coordinator), S. A. Seah, V. Hayward, J. Hartcher-O'Brien, C. Pacchierotti (PIs), H2020 Research and Innovation action, FET Open project, 200,000 €/year of 1,000,000 €/year.
2018–19 *Distal Projection of Tactile Sensations from Oculomotor Signals*, Research Contract, Oculus VR, US\$ 117,000.
2017–18 *Hand-to-Hand Remote Deafblind Tactile Communication*, Google Faculty Research Award, V. Hayward, US\$ 91,000.
2017–18 *Visiting Professorship*, The Leverhulme Trust, £ 84,400 + £ 84,400.
2016–20 *Developmental trajectories of sensorimotor control of mechanical tools*, L'Agence nationale de la recherche, (Developmental_Tool_Mastery), A. Farnè (Coordinator), A. Roy, V. Hayward, F. de Vignemont (PIs). 35,100 €/year of 151,000 €/year.

5.2.2 Completed

2016–17 *Software Layers for Deafblind Tactile Communication*, Google Faculty Research Award, V. Hayward, US\$ 63,000.
2013–17 *Wearable Haptics for Humans and Robots* (WEARHAP), Technological Development Project, Integrated Project (IP), 7th Framework Programme, D. Prattichizzo (Coordinator), M. O. Ernst, S. Hirche, E. P. Scilingo, M. Bergamasco, A. Argyros, M. A. Otaduy, N. Tsagarakis, V. Hayward, B. B. Edin (PIs), 147,394 €/year of 1,925,000 €/year.
2013–17 *Virtual Prototyping of Tactile Displays* (PROTOTOUCH), Marie-Curie Action: Initial Training Networks (ITN), 7th Framework Programme, M. Adams (Coordinator), J.-L. Thonnard, J. Wessberg, J. Peric, R. Tomaz, J. Schmidhuber, V. Hayward, B. Lemaire-Semail, C. Chapaz, U. Groz (PIs), 1,014,726 €/year
2010–16 *Computational Theory of Haptic Perception* (PATCH), 7th Framework Programme, European Research Council Advanced Grant, V. Hayward (PI), M. Wexler (co-PI). 495,000 €/year.
2015–17 *Optimal Person-Machine Sensorimotor Coupler for Application to Micro-Manufacturing* (RELAX), ERC-Proof-of-Concept Project, Horizon 2020 Excellent Science, V. Hayward (PI), S. Régner (co-PI), 150,000 €.
2015–16 *Tactile Communicator for Use by The Deafblind*, Google Faculty Research Award, V. Hayward, US\$ 50,000.
2011–12 (Declined) *Studying ageing-related effects on temporal neural coding of haptic perception: Experimental investigation in humans through an emerging technology for non-invasive electrophysiological recordings*. Subvention Emergence-UPMC. A. Arleo, V. Hayward (co-PIs). 83,000 €
2009–14 *The Hand Embodied (the)*, Technological Development Project, Integrated Project (IP), 7th Framework Programme, A. Bicchi (Coordinator), M. Santello, A. Albu Schaeffer, P. van der Smagt, K. Kyriakopoulos, D. Prattichizzo, S. Rossi, A.M.L. Kappers, V. Hayward, M. O. Ernst, H. Jörntell, (PIs). 156,612 €/year of 1,793,923 €/year.
2008–11 *Natural Interactive Walking*, Technological Development Project STREP, 7th Framework Programme, F. Fontana (Coordinator), J. Cooperstock, S. Serafin, A. Lécuyer, V. Hayward (PIs). 106,000 €/year of 391,000 €/year.
2007–11 *Physically and Perceptually Based Haptics*, Discovery Grant, Natural Sciences and Engineering Research Council of Canada (NSERC), V. Hayward, \$48,200/year.
2006–10 *The design of Multi-Modal Information Displays*. Collaborative Research and Development Grant. Natural Sciences and Engineering Research Council of Canada (NSERC), V. Hayward, J. J. Clark & K. E. MacLean, \$57,600/year plus industry contributions (\$36,225/year cash, \$40,000/year in-kind)
2006–09 *Informatisation du graphisme tactile à l'usage des personnes aveugles ou handicapées visuelles*. Group grant. Fonds québécois de la recherche sur la nature et les technologies (FQRNT), V. Hayward, A. Dufresne, N. Trudeau. \$42,000/year.
2006–08 *Sound and Interaction in the Design of Enactive Interfaces*. Special Research Opportunity - Research Project, Natural Sciences and Engineering Research Council of Canada (NSERC) M. Wanderley, V. Hayward, S. McAdams, Ph. Depalle, G. Scavone, and C. Guastavino, \$272,000. \$207,000
2005–08 *High Fidelity Surgical Simulation*. Collaborative Research and Development Grant. Natural Sciences and Engineering Research Council of Canada (NSERC), V. Hayward, \$51,000/year plus industry contributions (\$17,000/year cash; \$20,000/year in-kind).

- 2003–07 *High Fidelity Haptics*, Discovery Grant, Natural Sciences and Engineering Research Council of Canada (NSERC), V. Hayward, \$45,000/year.
- 2002–05 *Foundations of Haptic Interfaces for Virtual Environments and Communications*, Group Grant. IRIS-4, NCE (Institute for Robotics and Intelligent Systems, Canada's Network of Centers of Excellence). V. Hayward (Project Leader), K. E. MacLean, S. J. Lederman, D. K. Pai, S. E. Salcudean, \$204,000, \$202,000, \$192,000.
- 2002–05 *Reality-based Modeling and Simulation of Physical Systems in Virtual Environments*. Group Grant. IRIS-4, NCE. W. Heidrich (Project Leader), U. M. Ascher, V. Hayward, A. K. Mackworth, D. K. Pai, R. J. Woodham, \$200,000, \$200,000, \$200,000.
- 2002–05 *Intelligent Tools for Diagnosis and Intervention*, Group Grant. IRIS-4 NCE. S. E. Salcudean (Project leader), J. Dill, R. Ellis, V. Hayward, P. D. Lawrence, C. MacKenzie, J. McEwen, A. M. Parameswaran, S. Payandeh, T. M. Peters. \$300,000, \$300,000, \$300,000.
- 2002–03 *A Haptic Surgery Simulator (HASS) for Holmium Laser Enucleation of the Prostate*. Grant. IRIS-TGAP. V. Hayward, M. Mahvash, \$99,615 plus \$35,000 industry contributions.
- 2003–04 *The Braille Cell Revisited: Achieving an Order-of-Magnitude of Cost Reduction*. FRSQ/Centre de recherche interdisciplinaire en réadaptation (CRIR), \$10,000.
- 1999–03 *Advanced Human-Machine Interfaces*. Operating Grant, Natural Sciences and Engineering Research Council of Canada (NSERC), V. Hayward, \$38,000 then \$39,900/year.
- 1999 *Mass Producible Tactile Displays*. Grant. IRIS-TGAP. M. Cruz-Hernandez and V. Hayward, \$39,000 plus \$20,000 industry contributions.
- 1998 *Hysteresis model for Altair Deformable Mirror*. Research Contract, National Research Council, Herzberg Institute for Astrophysics. V. Hayward. \$2,400.
- 1998–02 *Haptic Interfaces for Virtual Environments and Communications*, Group Grant. IRIS-3, NCE. V. Hayward (Project Leader), D. K. Pai, S. J. Lederman, S. E. Salcudean, R. L. Klatzky (Principal Investigators), C. Ramstein, HTI (Industry Participant). \$163,000; \$140,000, \$133,000, \$121,000, plus industry contributions.
- 1998–02 *Intelligent Tools for Diagnosis, Surgery and Measurement of Resulting Patient Outcomes*. Group Grant. IRIS-3, NCE. S. E. Salcudean (Project Leader), J. Dill, R. Ellis, V. Hayward, P. D. Lawrence, C. MacKenzie, A. M. Parameswaran, S. Payandeh, T. M. Peters. J. McEwen (Industry Participant). \$369,000/year, plus industry contributions.
- 1998–02 *Reality-Based Modeling and Simulation of Physical Systems in Virtual Environments*. Group Grant. IRIS-3, NCE. D. K. Pai, (Project Leader), U. Ascher, V. Hayward., A. Mackworth, R. Woodham. \$171,000, \$164,000, \$129,000, \$126,000, plus industry contributions.
- 1996–98 *A Balanced Haptic Device for Computer/User Interaction*. Technology Partnership (TPP) Grant, NSERC, with MPB Technologies Inc., Montréal, Canada., V. Hayward, L. Lessard, \$224,000, plus \$367,000 plus industry contributions.
- 1995 *Development of Demonstration for Stylus Haptic Device*. Research Contract, MPB Technologies Inc., V. Hayward, \$8,500.
- 1995–99 *High Performance Robotic Devices*, Operating Grant, NSERC, V. Hayward, \$32,500/year.
- 1995 *Support System for Control System Design and Simulation*, Equipment Grant, NSERC, P. R. Bélanger, G. Zames, P. E. Caines, M. S. Verma, J. G. Owen, H. Michalska, L. Lin, \$42,000.
- 1995 *Test Station*, Equipment Loan Canadian Microelectronics, N. C. Rumin, G. R. Gao, J. Rajski, G. W. Roberts, T. H. Zsymanski, V. Hayward, M. D. Levine, D. V. Plant. \$125,913.
- 1994–98 *Haptic Interfaces for Teleoperation and Virtual Environments*. Group Grant. IRIS-2, NCE. V. Hayward, (Project Leader), R. Ellis, J. M. Hollerbach, L. Jones, S. Lederman, D. Pai, T. Salcudean, C. Ramstein, R. Hui, J. Ballantyne, M. Boyer (Industrial Collaborators). \$260,000; \$246,000; \$193,000; \$193,000. Plus industry contributions.
- 1994–98 SMART SENSING FOR COMPUTER VISION. Group Grant. IRIS-2, NCE. D. Poussart (Project Leader), S. Gagné, D. Gingras, V. Hayward, N. Benoit, X. Maldague, Y. Savaria, M. Tremblay. \$270,000; \$250,000; \$200,000; \$200,000. Plus industry contributions.
- 1995–96 *Design and construction of Force-Feedback Mechanisms for DSM*. Phase II and III. Research contract, Canadian Space Agency, V. Hayward, \$150,000.
- 1992–94 *Sensor Based Robots*. Operating Grant, Natural Sciences and Engineering Research Council of Canada (NSERC), V. Hayward, \$28,000 per year.
- 1992–94 *Conception, commande et réalisation expérimentale de robots manipulateurs à architecture parallèle et hybride*. Group Grant, FCAR (Fonds Formation des Chercheurs Aide à la Recherche), V. Hayward, L. K. Daneshmend, J. Angeles, C. Gosselin. \$41,000; \$35,000; \$35,000.
- 1989, 91, 93 *First, Second then Third International Symposium on Experimental Robotics*, Research Contract. CSA (Canadian Space Agency), V. Hayward. \$5,000; \$4,000; \$7,000.

- 1991, 92, 93 *Development of a Miniature Hand-Controller with Tactile Feedback Capability*, Phase I, II, and III Research Contracts, CSA. V. Hayward, \$49,000; \$79,000; and \$125,000.
- 1991 *Trajectory Planning and Obstacle Avoidance*, Research contract. International Submarine Engineering, Ltd., CSA STEAR Project #5, V. Hayward, L. K. Daneshmend. \$19,000.
- 1992–94 *Orienting Devices for Dynamic Vision Sensing*. Group Grant. IRIS-1, NCE, D. Poussart, C. Gosselin, V. Hayward, M. D. Levine. \$20,000; \$20,000.
- 1990–94 *Simulation, Control, and Planning in Robotics*. Group Grant. IRIS-1, NCE, P. R. Bélanger (Project Leader), J. Angeles, R. Patel, L. Daneshmend, V. Hayward, G. Zames, P. Caines, A. Malowany, \$245,000; \$1,067,475; \$1,266,983; \$537,300; \$507,500.
- 1990–94 *High Performance Manipulators: Design and Architecture*, Group Grant. IRIS-1, NCE, I. Hunter, (Project Leader), J. Angeles, J. Hollerbach, V. Hayward., G.R. Gao. \$370,700; \$370,700; \$281,700; 290,300; \$252,500.
- 1990–92 *Development of a Collision-Free Motion Planning Technique For MCPL, the MSS Command and Programming Language*. Research Contract, spar Aerospace Ltd., V. Hayward, A. Foisy, \$96,000.
- 1990 *Autonomous Robotics*, Research Contract, Thomson Systems, CSA STEAR Project #3, L. K. Daneshmend, V. Hayward, S.C. Cai, M. D. Levine, F. Ferrie, G.R. Gao, R. De Mori. 1990.
- 1989–91 *Conception, commande et réalisation expérimentale de robots manipulateurs à architecture parallèle*. Group Grant. FCAR. V. Hayward, L. K. Daneshmend, J. Angeles, \$37,000, \$25,000, and \$25,000.
- 1989–92 *Sensor Based Robots*. Operating Grant, NSERC, V. Hayward, \$18,000 per year.
- 1989–92 *Maintenance télérobotique des lignes haute tension*, CRIM collaborative project with Hydro-Québec, L. K. Daneshmend, V. Hayward, \$150,400.
- 1988 *Advanced Collision-Free Motion Planning Methods for MCPL, the MSS Command and Programming Language*. Research Contract, SPAR Aerospace Ltd., V. Hayward, L. K. Daneshmend, \$50,130.
- 1988 *Mobile Servicing Station (MSS) Task Analysis, Decomposition, and Planning, of an Operational Scenario for MCPL, the MSS Command and Programming Language: the Attached Payload Servicing Function*. Research Contract, SPAR Aerospace Ltd. ,L. K. Daneshmend, V. Hayward, \$56,998.
- 1988 *Porting RCCL Under the Harmony Operating System*, Research Contract, National Research Council of Canada, V. Hayward, L. K. Daneshmend, \$68,000.
- 1987 *Technology development for the MSS Command/Programming Language (MCPL)*. Research Contract, SPAR Aerospace Ltd., V. Hayward, L. Daneshmend, \$50,000.
- 1987–88 *Porting the Robot Control C Library to a Distributed Multiprocessor Computing System*. Research Contract, Jet Propulsion Laboratory (JPL), National Aeronautics and Space Administration (NASA), V. Hayward, L. Daneshmend. \$173,000, \$23,000.
- 1987–90 *Range Understanding for Robotics*. Strategic Grant, NSERC, M. D. Levine, A. S. Malowany, V. Hayward, S. W. Zucker, \$93,467 per year.
- 1987 *Robotic Rangefinder*. Equipment Grant, Natural Sciences and Engineering Research Council of Canada (NSERC) M. D. Levine, A. S. Malowany, V. Hayward, S. W. Zucker, \$136,467.
- 1986–88 *Sensor Based Robots: Implications For Control, Programming, and Off-line Programming*. Operating Grant, (NSERC), V. Hayward, \$15,400 per year.
- 1985–87 *Conception et commande des manipulateurs robotiques*. FCAR actions structurantes, Equipement, McGill Research Centre for Int. Machines. P. R. Bélanger and nine others.
- 1985–87 *McGill Research Center for Intelligent Machines*, Infrastructure Support Grant, P. R. Bélanger and eleven others.
- 1984 *Interface CAO-Robot*. Research Contract. Institut de Recherche en Construction Navale (IRCN), A. Osorio, V. Hayward.
- 1984 *Unix Workstation*, Equipment Loan from Hewlett Packard Laboratories, V. Hayward.
- 1983–84 *Advanced Industrial Robot Control Systems*, Research Grant, National Science Foundation, (NSF), R. P. Paul, J. Y. S. Luh, S. Y. Nof, V. Hayward.
- 1982–83 *VAX Computer*. Computer Integrated Design Manufacturing Automation Center, CIDMAC Program. Purdue University.
- 1982 *Post-doctoral Fellowship*. Automatique et Robotique Avancée (ARA), V. Hayward, 1982.
- 1979–81 *Optimisation Dynamique de Ressources et Reprogrammation*, automatisation, Thème Robotique Industrielle, Action DGRST, A. Osorio, V. Hayward.

6 Teaching

6.1 Courses Taught

6.1.1 Université Pierre et Marie Curie

2009–16 *Interfaces et réalité virtuelle* NSR20 then 5AR06 (niveau M2+ROB5), enrollment: 22, 10, 15, 16, 20, 20 (30 hours)

2009–16 *Haptics for rehabilitation* NSR02 then 5AH13 (Master International, 50%), enrollment: 14, 15, 18, 18 (18 hours).

2009–16 *Asservissement numérique*, (level ROB4) enrollment: 25, 22, 24, 22, 25, 22 (20 hours)

6.1.2 Politecnico Di Milano

2014–16 *Haptics* (Master in Mechanical Engineering, School of Industrial and Information Engineering) enrollment: 22, 15

6.1.3 McGill University

2006–08 *Sampled Data Control* ECSE-504 (graduate), enrollment: 8, 8, 12 (Winter).

2004 *Haptics in Humans and Information Systems* (graduate colloquium 681), enrollment: 10.

2007 *Haptics*, ECSE-628, enrollment: 8 (Fall).

1992–97 *Computer Architecture and Organization* 304-425 (senior), 3 credits, enrollment: 50 (Fall 92), 70 (Fall 93),

1999–08 85 (Fall 94), 85 (Fall 95), 112 (Fall 96), 100 (Winter 99), 100 (Fall 99), 49 (Winter 00) 85 (Fall 00), 55 (Winter 01), 74 (Fall 01), 65 (Winter 02), 68 (Winter 03), 70 (Fall 03), 43 (Fall 04), 45 (Fall 05), 25 (Winter 08).

96,97,99 *Computer Architecture Laboratory* 304-487 (senior), 3 credits, enrollment: 35 (Winter 96), 43 (Winter 97),

2000–05 39 (Winter 99), 23 (Winter 00), 48 (Winter 01), 62 (Winter 02), 65 (Winter 03), 60 (Winter 04). 53 (Winter 05).

1991–95 *Robotics and Control Laboratory* 304-493 (senior), 2 credits, enrollment: 5 (Winter 91), 8 (Winter 92), 12 (Winter 93), 20 (Winter 94) 8 (Winter 95).

1990–91 *Introduction to Computer Engineering I* 304-221 (undergraduate) 3 credits, enrollment: 70 (Fall 90),

96,98 70 (Winter 91), 83 (Fall 96), 150 (Fall 98), 141 (Fall 99).

1991 *Introduction to Computer Engineering II* 304-222 (undergraduate), 3 credits, enrollment: 70 (Fall 91).

1990–06 *Electrical Engineering Design Project*, 304-494 (senior), 3 credits, about 3 project/year since 1990.

1986–93 *Artificial Intelligence*, 304-526 (graduate) 3 credits, enrollment 15 to 25.

6.1.4 Université Paris XI

1984 *Conception des robots, modélisation, commande et programmation* (24 heures). Cours de DEA (Diplôme études approfondies), Enrollment: 15.

6.1.5 Purdue University

1982 *Computer languages: C, APL*. Undergraduate courses, Enrollment: 120.

6.2 Supervision

6.2.1 London University

In Progress

2018– Antonio Cataldo, Post Doctoral Fellow

6.2.2 Sorbonne Université (formely Université Pierre et Marie Curie)

In Progress

2018– Thomas Daunizeau, Ph.D.

2016– Basil Duvernoy, Ph.D.

2015– Camille Fradet, Ph.D.

2018– Louise P. Kirsch Post Doctoral Fellow

2018– Xavier Job Post Doctoral Fellow

Completed Post-Doctoral Supervision

- 2016–18 Gabriel Arnold, Post Doctoral Fellow, then Research Scientist Caylar SAS.
- 2015–16 Jess Hartcher-O'Brien, Post Doctoral Fellow, then Assistant Professor, Faculty Industrial Design Engineering, Delft University.
- 2013–15 Stephen Sinclair, Post Doctoral Fellow (WEARHAP), then Research Engineer at INRIA-Chile, Santiago, Chile.
- 2014–15 Wouter Bergmann Tiest, Post Doctoral Fellow (PATCH), then, Scientist Vrije Universiteit Amsterdam.
- 2011–13 Alexander Terekhov, Post Doctoral Fellow (PATCH), then, Scientist, Laboratoire Psychologie de la Perception, Université Paris Descartes/CNRS.
- 2009–13 Irene Fasiello, Post Doctoral Fellow (PATCH), then Professeur, Institut des Jeunes Aveugles, Paris
- 2010–13 Jonathan Platkiewicz, then Fulbright Fellow at Cornell University, Ithaca, NY, USA, then Junior Faculty Buzsáki Lab, NYU Neuroscience Institute USA.
- 2011–12 Yon Visell, Post Doctoral Fellow, (PATCH), then Assistant Professor, University of California Santa Barbara.
- 2011–12 Michaël Wiertelowski, Post Doctoral Fellow (PATCH), Chargé de Recherches CNRS, Aix-Marseille University.
- 2009–10 Nizar Ouarti, Post Doctoral Fellow, (CNRS), Maître de Conférences, UPMC.

Completed Doctoral Supervision

- 2015–17 Özgür Mutlu, Ph.D. *Optimizing Tactile Displays through Tribological & Perceptual Analyses during Active Touch*.
- 2013–17 Séréna Bochereau, Ph.D. *Perception, Recording and Reproduction of Physical Invariants during Bare Fingertip Exploration of Tactile Textures*, then Post Doctoral Fellow at Oculus Research.
- 2011–16 Bernard Javot, Ph.D. (part-time) *Conception d'une nouvelle architecture de moteur oscillant à contact permanent*, High-school teacher, then Research Engineer at the Max Planck Institute for Intelligent Systems.
- 2010– Amir Berrezag, Ph.D. thesis not completed for personal reasons
- 2011–14 Charles Hudin, Ph.D. *Focalisation par retournement temporel dans les plaques minces : Application à la stimulation tactile* (CEA), then Scientist Commissariat à l'Energie Atomique et aux Energies Alternatives.
- 2009–13 Ildar Farkhatdinov, Ph.D.: *Modeling verticality estimation during locomotion*, the Post-Doctoral Fellow Imperial College London.
- 2009–13 Abdenbi Mohand-Ousaid, Ph.D.: *Conception d'une chaîne de micro téléopération stable et transparente* (co-supervised with Pr S. Régner) then Maître de Conférences, Université de Franche-Comté.
- 2008–11 Michaël Wiertelowski, Ph.D.: *Reproduction of Tactual Textures: Transducers, Mechanics, and Signal Encoding*, then Chargé de Recherches CNRS Université d'Aix-Marseille
- 2006–11 Dung Viet Cai, Ph.D.: *Contribution à l'étude d'exosquelettes isostatiques pour la rééducation fonctionnelle, application à la conception d'orthèses pour le genou*. (co-supervised with Pr Ph. Bidaud et F. Gosselin) maintenant Assistant Professor, Ho Chi Minh City Univ. of Tech. and Education, Vietnam
- 2005–09 Guillaume Millet, Ph.D.: *Perception et interface haptique pour les nanosciences* (S. Régner, principal adviser), Patent Examiner, European Patent Office.

Research Engineers Supervised

- 2014–15 Aravindraj Bakthavatchalam, then Research Engineer at UPMC
- 2013–15 Ramakanth Singal, Research Engineer
- 2010–13 Rafał Pijewski, Research Engineer (THE), then, entrepreneur.
- 2010–13 Chao Sheng Wong, Research Engineer, then Engineer at Octio AS
- 2010–11 Gautier Long, Research Engineer
- 2009–10 Amir Berrezag, Research Engineer, Ph.D. at UPMC
- 2008–09 George Dietz, Research Engineer, Graduate Student, McGill University

Completed Master's Supervision

- 2016 Basil Duvernoy, Master's, then PhD UPMC.
- 2015 Flavien Quijoux, Master's, then Physical therapist.
- 2014 Camille Fradet, then PhD UPMC.
- 2014 Cedric Sepulveda, Master's, then Physical therapist.
- 2012 Alister Fournet, then PhD UPMC.

- 2011 Ryuta Ogazaki (University of Electro-communications), *multimodal perception*
- 2010 Michi Sato (University of Electro-communications), *multimodal device*
- 2010 Guillaume Malatray
- 2010 Romain Mecaa
- 2010 Gautier Long, Research Engineer, UPMC
- 2008 Amir Berrezag, Master, Research Engineer, UPMC

6.2.3 McGill University

Completed Post-Doctoral Supervision

- 2007–08 Mounia Ziat, Post Doctoral Fellow, (NSERC-SRO), Associate Professor at Northern Michigan University.
- 1999–01 Gabriel Robles de la Torre, (NSERC and IRIS-NCE), scientist, founded the International Society for Haptics, <http://www.isfh.org/>
- 1997–98 Farrokh J. Sharifi, (NSERC fellow), Professor at Ryerson University, Toronto
- 1997–98 Luc Joly. (Commissariat à l'Énergie Atomique). Staubli Robotics
- 1992–94 Bertrand Duplat. *Hand Controller Design* (Electricite de France), Founder of Virtools SA
- 1991–92 Fabienne Reynier, (Canadian Space Agency)

Completed Doctoral Supervision

- 2004–10 Hsin-Yun Yao, Ph.D. *A vibrotactile transducer and its applications in the study of perception* (NSERC, Immersion, committee: Prof. Ph. Depalle, Prof. M. Popovic). Entrepreneur.
- 2003–09 Vincent Levesque, Ph.D. *Virtual Display of Tactile Graphics and Braille by Lateral Skin Deformation* (NSERC, FQRNT, committee: Prof. A. Dufresne, Prof. J. Cooperstock). Post Doctoral Fellow, University of British Columbia.
- 2004–09 Gianni Campion. Ph.D. *The synthesis of three dimensional haptic textures, geometry, control, and psychophysics* (IRIS-NCE, NSERC, committee: Prof F. P. Ferrie, Prof A. M. Smith, Prof. P. Poulin), Post Doctoral Fellow, Boston University.
- 2004–09 Andrew H. Gosline, Ph.D. *Haptic Synthesis of Dynamically Deformable Materials*. (IRIS-NCE, NSERC, committee: Prof. D. Giannacopoulos, Prof R. Mongrain), Post Doctoral Fellow, McGill University
- 2003–08 Jérôme Pasquero, Ph.D. *Tactile display for mobile interaction*. (IRIS-NCE, NSERC, committee: Prof. J. Cooperstock, Prof. C. E. Chapman), scientist, Research In Motion Inc.
- 2003–07 Qi Wang, Ph.D. Ph.D. *A Biomechanically Optimized Tactile Transducer and Tactile Synthesis*. (IRIS-NCE, NSERC, committee: Prof. A. M. Smith, J. J. Clark). Assistant Professor Columbia University
- 1999–02 Mohsen Mahvash, Ph.D. *Haptic Rendering of Tool Contact And Cutting*. (IRIS-NCE, committee: Profs. B. Boulet and J. Clark), entrepreneur and Post Doctoral Fellow at John Hopkins University
- 1998–02 Dingrong Yi, Ph.D. *Computer Aided Display of 3D Angiograms, Using Graphics and Haptics* (IRIS-NCE, committee: Profs. K. Siddiqi and J. J. Clark), scientist, Sunnybrook and Women's College Health Science Center. Assistant Prof. Chinese University Hong Kong.
- 1995–01 Erick Dupuis, Ph.D. *A General Framework For the Manual Teleoperation of Kinematically Redundant Space-based Manipulators*. (committee: Profs. E. Papadopoulos, J. Angeles), scientist, Canadian Space Agency.
- 1996–00 Oliver R. Astley, Ph.D. *A Software Architecture For surgery Simulation Using Haptics*. (NSERC Fellowship and IRIS-NCE, committee: Profs. Cooperstock, Whitesides, scientist, GE Central Labs.
- 1994– Julie Payette, (Supervisory committee Profs. De-Mori, P. Kabal, M. Buehler) (Ms. Payette is an astronaut, withdrew from the program July 1996 due to space flight training)
- 1994–99 Danny Grant, Ph.D. *Accurate and Rapid Control of Shape Memory Alloy Actuators*. (IRIS-NCE, committee: Prof. Buehler, Prof. Galiana). V.P. Research, Immersion Corp.
- 1995–98 Juan Manuel Cruz-Hernández, Ph.D. *Reduction of Hysteresis: a Phase Control Approach*. (Mexican Gov., then NSERC, supervisory committee: Profs. Bélanger, Zames), scientist, Immersion Canada Inc.
- 1990–94 André Foisy, Ph.D. *Robust Collision Detection*, (Research Contract, SPAR Aerospace, supervisory committee: Profs. S. W. Zucker, L. K. Daneshmend), scientist, SoftImage.
- 1990–92 Louis-Phillippe Demers, Ph.D. *Autonomous Control of the Space Station Manipulator System*, (Research Contract, SPAR Aerospace), never completed, international artist
- 1989–94 John Lloyd, Ph.D. *Robot Trajectory Generation for Paths With Kinematic Singularities*. Dean's Honour List. (IRIS-NCE, Profs. S. W. Zucker and Professor L. K. Daneshmend), scientist, UBC
- 1990–94 Stéphane Aubry, Ph.D. *Three-Dimensional Model Construction From Multiple Sensor Viewpoints*. (FCAR, Profs. M. D. Levine, F. Ferrie, O. Elghindy), Algorithmica Inc.

Completed Master's Supervision

- 2008–10 Xinjelifu, X. M. Eng. Title not yet determined. (co-supervised with Prof H. Michalska)
- 2004–06 Gaurav Sood, M. Eng. *Simulation and Control of a Hip Actuated Robotic Model for the Study of Human Standing Posture*. Tembec Inc.
- 2003–05 Omar Ayoub, M. Eng. *Robotic Model of the Human Standing Posture*. Microsoft.
- 2002–05 Hanifa Dostmohamed. M.Eng. *Presentation of Shape Through Contact Location Trajectory*, Medical school.
- 2003–05 Diana Garoway, M.Eng. *A Haptic Interface for Editing Space Curves with Application to Animation Authoring*. SoftImage.
- 2002–04 Hsin-Yun Yao. M.Eng. *Touch Magnifying Instrument Applied to Minimally Invasive Surgery* (co-supervised with Prof. Ellis, Queen's), PhD Candidate.
- 2000–03 Vincent Levesque, M.Eng. *Measurement Of Skin Deformation Using Fingerprint Feature Tracking* (co-winner best demonstration award, IRIS-PRECARN Conf. '02), PhD Candidate.
- 2000–03 Jérôme Pasquéro, M.Eng. *STReSS: A Tactile Display Using Lateral Skin Stretch* (co-winner best demonstration award, IRIS-PRECARN Conf. '02), PhD Candidate.
- 1997–99 Qing Yuan Wang, M. Eng. *Translation of Graphic to Haptic Boundary Representation*. (IRIS-NCE, co-supervised with Prof. F. Sharifi). Motorola Canada.
- 1996–98 Stephanie Greenish, M.Eng. *Acquisition and Analysis of Cutting Forces of Surgical Instruments for Haptic Simulation*. (NSERC TPP). Matrox.
- 1996–97 Matthew M. Roy, M.Eng. *Design and Fabrication of a Lightweight Robotic Manipulator*. (NSERC TPP, co-supervised with Prof. Lessard)
- 1996–97 John McDougall, M.Eng. *Design of a composite link for the Freedom-7 Haptic Hand Controller*. (NSERC TPP, co-supervised with Prof. Lessard).
- 1995–97 Xuemei Alexandra Lu, M.Eng. *Modelling and Design of High Strain Shape Memory Alloy Actuators*. (IRIS-NCE). Nortel.
- 1994–96 Alain Ouellet, M.Eng. *Control of an Instrumented Haptic Interface*. (Canadian Space Agency, co-supervised with Prof. M. Buehler), Scientist. CSA.
- 1995–96 Oliver Astley, M.Eng. *Autonomous Joint Calibration Using Adaptive Control*. Dean's Honour List, (NSERC Fellowship). Ph.D. Candidate, McGill.
- 1995–96 Pham Tam Loc, M.Eng. *Micro Network Protocol and Hardware Design for Distributed Data Acquisition*. (NCE-IRIS). Memotec Inc.
- 1994–95 Juan Manuel Cruz Hernández, M.Eng. *Modeling, Sensitivity analysis and control design for a tendon transmission*. (Mexican Gov.). Ph.D. Candidate, McGill.
- 1994–95 Jimmy Wang. M.Eng. *Modeling and Control of a Actuator Redundant Hydraulic Shoulder Joint*, (NCE-IRIS).
- 1992–94 Danny Grant, M.Eng. *Shape Memory Alloy Actuator with an Application to a Robotic Eye*. (NSERC). Ph.D. Candidate, McGill.
- 1992–94 Michel Doyon, M.Eng. *Decentralized Impedance Control*, (NSERC and IREQ). Scientist Canadian Space Agency.
- 1992–94 Mehron Vaezi, M.Eng. *Force Balancing in a Parallel Redundantly Actuated Mechanism*, (NCE-IRIS). Entrepreneur.
- 1991–93 Xianze Chen, M.Eng. *Six Degree of Freedom Tactile Stimulator for Psychometric Investigations*. (Space Agency Research Contract)
- 1990–92 Benoit Boulet, M.Eng. *Modeling and Control of a Robotic Joint with In-parallel Redundant Actuators*, Dean's Honour List. (NSERC), Prof. at McGill.
- 1989–91 Anthony Topper, M.Eng. *A Computing Architecture For a Multiple Robot Controller*, (FCAR).
- 1988–90 Ronald Kurtz, M.Eng. *Kinematics and Optimization of a Parallel Robotic Wrist Mechanism with Redundancy*, Dean's Honour List, (FCAR).
- 1986–87 Pierre Girouard, M.Eng. *Un système expert pour la gestion en temps réel des alarmes dans un réseau électrique* (FCAR). Entrepreneur.
- 1986–87 Jean Michel Arès, M.Eng. *A knowledge-based model and simulator for alarm and protection of power networks*. (FCAR). Entrepreneur.
- 1987–89 Ajit Nilakantan, M.Eng. *The Design and Implementation of an All Digital Shear Sensitive Tactile Sensor*. (NSERC). Co-Founder Cymmetry Systems Inc.

Completed Honour's Theses

- 2005 Yan Zhao, *Investigation of Human Adaptation in the Judgement of Applied Force*, graduate Student Northwestern University.

- 2002 Thimothée Doutriaux, *Design of Fluxgate Magnetometer*, graduate Student, MIT
- 2000 Eric Teodori, *FEM Analysis of Tactile Display*.
- 1997 Christine Desmarais, *Skin Stretch Tactile Display*, Rhodes Scholar at the University of Oxford, CAE Electronics Inc. 1997]
- 1997 Jason C. Chen, *Adaptive Velocity Estimation Techniques with Applications to Haptic Interfaces*, (Winner the Best Canadian IEEE Student Paper), entrepreneur
- 1997 Ming Hua Lim, *Direction Estimation Using Adaptive Windowing Techniques*
- 1993 Martin Becker, *Design and Kinematic Modeling of a Parallel Redundant Wrist*, Dipl. Ing. Thesis (Inst. Mechanics, TU Munich)
- 1993 François Mougnet, *Limit Cycles and Digital Control of a Hydraulic Actuator*, exchange student

Research Engineers Supervised

- 2002–03 Qi Wang. Ph.D. Candidate
- 1996–98 Michel Doyon. Scientist with the Canadian Space Agency
- 1998–99 Pedro Gregorio. Research Engineer (part time), now with Immersion Canada Inc.
- 1994–95 Mathew Mather. Research Engineer (part time) with CITI, Immersion Canada Inc. then Officer with the Office of Technology Transfer, McGill University, now Sci-Fi novelist.
- 1993–95 Ducan Baird. Research Engineer now with Hymark Inc., Ottawa.
- 1996–97 Jason C. Chen. Entrepreneur
- 1995–96 Eric De Silva. Dassault Systèmes
- 1991–93 Chaffye Nemri, V.P. Engineering. Discreet Logic

Visitors from Industry and on Sabbatical

- 2002–03 Dr. Ian Sinclair, MPB Technologies, Montréal.
- 2000–01 Dr. Daniel Sidobre, LAAS CNRS, France.
- 2001–04 Seigo Harashima, Ricoh Company (Japan)

7 Services

7.1 Departmental, Faculty and University Committees

7.1.1 University Level at UPMC

- 2013– Comité ERC-UPMC
- 2013– Membre de la commission sur promotion de professeurs Groupe IX
- 2012– Membre du comité “congéés pour recherches ou conversions thématiques”
- 2012–15 Membre du Directoire de la Recherche de l’UPMC
- 2011 Jury Émergence-UPMC 2011
- 2010 Retour d’expérience : Starting et Advanced Grants Programme 2011

7.1.2 University Level at McGill

- 2005–08 Speaker, grantsmanship meetings
- 2004–08 Beatty Memorial Lectures Committee
- 1998–08 Pro-Dean (about twice a year in the past 4 years)
- 1999–02 Academic Policy and Planning Committee
- 1998–02 McGill NSERC/Major Postgraduate Fellowships Evaluation Committee
- 1998–99 Groupe de Travail Conjoint Informatique — Génie informatique INFOGEN, Commission des Universités sur le Programmes (CUP)

7.1.3 Faculty Level at McGill

- 2004–05 Faculty Space Committee
- 2001–04 Director, Centre for Intelligent Machines (CIM), an internationally recognized centre for the advancement of robotics, automation, artificial intelligence, computer vision, and systems and control theory with members of two faculties: Engineering and Science (\approx 20 faculty, 100 students)
- 1998–02 Dean’s Advisory Committee on Reappointment

7.1.4 Departmental Level at McGill

2007–08 Tenure Committee Dept. of Electrical and Computer Engineering
2007–08 Promotion / Re-appointments Committee Dept. of Electrical and Computer Engineering
2007–08 Graduate Student Financing Committee Dept. of Electrical and Computer Engineering
2005–06 Appointments Committee Dept. of Electrical and Computer Engineering
2005–06 Appointments Committee Dept. of Mechanical Engineering
2005–06 ECE Issues Committee
2002–05 Chairman's Advisory Committee
1999–03 Committee on Information Technologies and Undergraduate Laboratory Equipment
1990–98 Graduate Program Committee. Department of Electrical Engineering.
1995–98 Merit Evaluation Committee (Elected)
1996–97 New Faculty Search Committee
1994–97 Teaching Assistant Coordinator
1991–92 Ad Hoc Search Committee for a Robotics Junior Position
1990 Coordinator for Electrical Engineering Open House Events

7.2 Professional Activities

7.2.1 Editorship

2010– Editorial Advisory Board Member, *Springer Series on Haptics and Touch Systems*
2007–11 Associate Editor, *IEEE Transactions on Haptics*
2007–14 Associate Editor, *ACM Transactions on Applied Perception*
1998– Member of Governing Board, *Haptics-e*
1994–98 Associate Editor, *IEEE Transactions on Robotics and Automation*

7.2.2 Private Advising

2013 Apple Inc., Cupertino, CA, USA
2012 Expert in litigation case, Rouse Legal, UK
2012 Expert in litigation case, Steptoe & Johnson LLP, Chicago, USA
2011 Immersion Corporation, California, USA
2011 Institute for Infocomm Research, A*Star, Singapore
2011 Mesa Imaging AG, Switzerland
2006–07 Intuitive Surgical, Sunnyvale, California, USA
1999 Engineering design consultant, l'OEUF's entry to maquette exhibit for the 10th anniversary gala dinner of the Canadian Centre for Architecture CCA, Montréal
1998 Interval Research, Palo Alto, California, USA
1997 MPB Technologies Inc., Montréal, Québec, Canada
1994–95 Center for Information Technology Information, Montréal, Québec, Canada
1993 International Submarine Engineering, Vancouver, BC, Canada
1993 Aqua Vision Systems, Montréal, Québec, Canada
1992 Hydro-Québec, Varennes, Québec, Canada
1992 Scientific advisor to the Montreal based theater and dance company Carbone 14
1991 Electricité de France, Paris, France
1990–92 Member of the Board of Advisors, Robotics Abstracts, Bowker A&I Publishing
1987 Jet Propulsion Laboratory, Pasadena, California, USA
1987 Lord Corporation, Raleigh, South Carolina, USA
1986–88 RCA Advanced Technology Laboratories, New Jersey, USA
1986 UFA Associates, Massachusetts, USA

7.2.3 Appointments with Agencies and Societies

2016– Chair of the IEEE Transactions on Haptics Management Committee (Representative to the Robotics and Automation Society)
2013– Member of the IEEE Transactions on Haptics Management Committee

- 2013–15 Member of the IEEE Fellow Evaluation Committee, Robotics and Automation Society
- 2012– Member of the EuroHaptics Society PhD award committee
- 2012–13 Member of the IEEE Fellow Nomination Committee, Robotics and Automation Society
- 2009–10 Member of the International Advisory Committee of the *Centre of Excellence for Information, Communication and Perception Engineering* (CEICCP)
- 2007–08 Grant selection panel member European Commission Program *Information Society and Media Directorate, Cognitive Systems and Robotics*
- 2005–08 Member of *Conseil Scientifique, Direction des recherches technologiques du Commissariat à l'énergie atomique (CEA)*, France
- 1994–05 Three time leader of national projects of the *Institute for Robotics and Intelligent Systems* (IRIS a federal Network of Centres of Excellence): 02-05: Foundations of Haptic Interfaces for Virtual Environments and Communications; 98-02: Haptic Interfaces for Virtual Environments and Communications; 94-98: Haptic Interfaces for Teleoperation and Virtual Environments
- 2004–07 Member of NSERC Grant Selection Committee GS-21 (Interdisciplinary)
- 2003–08 Member of the College of Reviewers, Natural Sciences and Engineering Council of Canada (NSERC), Special Opportunity Program
- 2000–08 Member College of Reviewers, *Canada Research Chairs Program*
- 1999–02 Elected member *PRECARN-IRIS* (NCE) Research Management Committee.
- 1995, 00 Three times panel member of the Robotics Program, *National Science Foundation*, Washington DC, U.S.A.
- 1989–92 Member of Comité de Programme Nouveaux Chercheurs Fonds pour la *Formation de Chercheurs et l'Aide à la Recherche*
- 1997,93 Member of Comité de Programme Equipes de Recherche Fonds pour la *Formation de Chercheurs et l'Aide à la Recherche*
- 1992–95 Co-Chair of the *IEEE Robotics and Automation Society Technical Committee on Programming Environments in Robotics and Automation*
- 1991–96 Member of Constitution Committee of IFToMM, *International Federation of Theory of Machines and Mechanisms*
- 1990–93 Member of the AIAA *Technical Committee on Space Automation and Robotics* (SARTC).
- 1989 Member of review committee the Mobile Robot for Health Care at the National Research Council of Canada, 1989

7.2.4 Societies

Eurohaptics Society

Institute of Electrical and Electronic Engineers (IEEE), IEEE Robotics Society

Former member of the Association for Computing Machinery (ACM)

Former member of the American Institute of Aeronautics and Astronautics

7.2.5 Start-Up Companies

Co-founder of VIR Solutions SAS/Actronika SAS ® (2014)

Co-founder and Honorary Director, Tactile Labs Inc., Montréal, Canada (2008)

Co-founder of RealContact Inc. Montréal, Canada, (November 2002)

Haptic Technologies Inc. was acquired by Immersion Corp, March 2000 (US\$ 7 MM) to become Immersion Canada Inc.

Co-founder of Haptic Technologies Inc., Montréal, Canada, (May 1995)

7.2.6 Ad Hoc Referee Appointments for Journals and Conferences

<i>ACM Transactions on Applied Perception</i>	1 (2016), 1 (2008), 4 (2007), 1 (2006), 3 (2005), 2 (2004)
<i>ACM Transactions on Human-Computer Interaction</i>	1 (2004)
<i>ACM CHI Conference</i>	2 (2012), 1 (2011), 2 (2010)
<i>ACM Computing Surveys</i>	1 (1990)
<i>Advanced Robotics</i>	1 (2005)
<i>ASME J. of Biomechanical Engineering</i>	1 (2008), 1 (2006)
<i>ASME J. of Dynamics, Measurement and Control</i>	1 (2012), 1 (2005), 1 (2003), 3 (2002), 1 (1997)
<i>ASME J. Mech Design</i>	1 (2008), 1 (2007), 1 (2006), 3 (1994), 1 (1993)
<i>Attention, Perception and Psychophysics</i>	1 (2016), 1 (2014), 1 (2013), 1 (2010), 3 (2009), 1 (2008), 1 (2007)
<i>Automatica</i>	2 (2003)
<i>ASME J. of Computing and Inf. Sci. In Eng.</i>	1 (2008)

Autonomous Robots 1 (1996)
Biological Cybernetics 1 (2013)
Cerebral Cortex 1 (2012)
Cognition 1 (2017)
Control Engineering Practice 1 (2005)
Current Biology 1 (2013)
eNeuro 1 (2017)
Disability and Rehabilitation 1 (2018)
Experimental Brain Research 1 (2015), 1 (2014), 1 (2012), 1 (2011), 1 (2010), 2 (2009), 2 (2007)
Frontiers in Robotics and AI 1 (2017)
Haptics-e 1 (2008), 1 (2003), 1 (2002), 1 (2001), 1 (2000)
IEEE Computer Magazine 1 (1990)
IEEE T. on Automatic Control 1 (2003)
IEEE T. on Automation Sci. and Eng. 1 (2008)
IEEE T. on Aerospace and Electrical Systems 1 (1994), 1 (1991)
IEEE T. on Control System Technology 1 (2010), 2 (2008), 1 (2007), 2 (2003), 1 (1999)
IEEE Computer Graphics and Applications 2 (2003)
IEEE T. on Computer Graphics and Visualization 1 (2006), 1 (2005), 1 (2002), 1 (2001)
IEEE T. on Haptics 2 (2016), 2 (2015), 2 (2014), 4 (2013), 5 (2010), 1 (2009)
IEEE/ASME T. on Mechatronics 1 (2014), 1 (2013), 1 (2011), 1 (2010), 2 (2009), 5 (2008), 3 (2007),
1 (2005), 1 (2003), 1 (2002), 1 (2000), 1 (1999)

IEEE T. on Neural Syst and Rehab. Eng. 1 (2016), 1 (2010), 1 (2007)
IEEE T. on Robotics [and Automation] 1 (2018), 1 (2016), 1 (2010), 2 (2007), 4 (2006), 3 (2005),
2 (2004), 3 (2003), 2 (2002), 1 (2001), 2 (1998), 2 (1997), 2 (1996),
5 (1995), 4 (1994), 5 (1993), 5 (1992), 3 (1991), 2 (1990), 1 (1989)

IEEE T. on Speech and Audio Processing 1 (2003)
IEEE T. on Pattern Analysis and Machine Intelligence 2 (1990)
IEEE Trans. on Systems, Man, and Cybernetics 1 (2006), 1 (2004), 1 (2003), 1 (2002), 1 (2001), 1 (1993), 1 (1991), 3 (1990)
IEEE T. on Biomedical Engineering 1 (2010), 1 (2005)
IEEE T. on Ultras., Ferroelectrics, and Freq. Control 1 (2008), 1 (2007)
IEEE T. on Visualization and Computer Graphics 1 (2009)
International J. of Control 1 (2007)
International J. Robotic Research 1 (2013), 1 (2012), 1 (2009), 3 (2008), 1 (2007), 1 (2006), 1 (2004),
1 (2003), 1 (1998), 2 (1997), 1 (1996), 2 (1995), 1 (1993)

J. Européen des Systèmes Automatisés 1 (2003)
J. of the Acoustic Society of America 1 (2010), 1 (2009)
J. of Biomechanics 1 (2009)
J. of Canadian Aeronautics and Space Institute 1 (1994), 1 (1991)
J. of Computing & Information Science In Engineering 1 (2008)
J. of Computer Science and Technology 1 (2008)
J. of Experimental Biology 1 (2009)
J. of Experimental Psychology: Human Perc. and Perf. 1 (2015)
J. of Field Robotics 1 (2013)
J. of Neurophysiology 1 (2017), 1 (2015), 1 (2012)
J. of Neuroscience 1 (2018), 1 (2014), 1 (2013)
J. of Neuroscience (Methods) 1 (2014) 2 (2013), 3 (2009)
J. of Robotics Systems 1 (1995), 1 (1994), 1 (1992), (1991), 1 (1990), (reviewer for the Journal)
J. of the Royal Society Interface 1 (2012), 1 (2009)
J. of Systems and Control Engineering 1 (2007)
J. of Urology 1 (2011)
Mechanisms and Machine Theory 1 (2001), 1 (2000), 1 (1994), 1 (1991)
Medical Image Analysis 1 (2003)
Medical Engineering & Physics 1 (2013), 1 (2010), 1 (2006)
Measurement Science and Technology 1 (2007), 2 (2005)
Meas., Instr. and Sensor Handbook, CRC Press 1 chapter (1996)
Multisensory Research 1 (2014)
Nature Biomedical Engineering 1 (2016)
National Science Review 1 (2018)
Pattern Recognition Letters 1 (2009)

<i>Perception</i>	1 (2018), 1 (2017), 1 (2014), 1 (2012), 2 (2007)
<i>PloS Computational Biology</i>	1 (2014)
<i>PLoS ONE</i>	1 (2016), 1 (2014), 1 (2011)
<i>Presence</i>	1 (2016), 1 (2008), 1 (2003), 1(2002)
<i>Proceedings of the IEEE</i>	1 (2018)
<i>Proceedings of the National Academy of Sciences</i>	1 (2012)
<i>Revue canadienne de génie élect. et de génie infor.</i>	1 (2007)
<i>Robotica</i>	1 (2008), 1 (2007), 1 (1998)
<i>Robotics and Autonomous Systems</i>	1 (2014)
<i>Quarterly Journal of Experimental Psychology</i>	1 (2013)
<i>Scientific Reports</i>	1, (2018), 1 (2014), 1 (2013)
<i>Sensors</i>	1 (2012)
<i>Sensors and Actuators A (Physical)</i>	1 (2000)
<i>Scholarpedia</i>	1 (2015)
<i>Scientific Reports</i>	1 (2016)
<i>SIGGRAPH</i>	1 (2006)
<i>Springer Verlag Publications</i>	1 book (2009), 1 chapter (2006), 1 book (1991)
<i>Springer Virtual Reality Journal</i>	1 (2005)
<i>Technique Et Science Informatiques</i>	1 (2008)
<i>T. on Industrial Electronics</i>	1 (2003)
<i>Virtual Reality</i>	1 (2006)

Review of numerous national and international conferences papers, 10-odd papers a year

7.2.7 Grant Application Refereeing

Agence Nationale de la Recherche, France	1 (2013), 1 (2011), 2 (2009), 1 (2008), 4 (2007), 5 (2006), 1 (2005)
Belgium Research Council	1 (1997)
Canada Council for the Arts, Killam Program	1 (2015), 1 (1999)
Canadian Foundation for Innovation	Site visit Committee (1999)
Canadian Institutes for Health Research	1 (2006), 1 (2002)
CSS Strategic Initiatives	1 (1991), 1 (1992)
CUNY Collaborative Incentive Res. Grant Program	1 (2006)
Deutsche Forschungsgemeinschaft (DFG) Clusters of Excellence	2 (2018)
European Research Council	2 (2016)
ETH Zurich Research Commission	1 (2012)
Fonds québécois de la recherche nature et technologies	1 (2004), 1(2003), 2 (1995), 1 (1994), 2 (1993)
Fonds national suisse de la recherche scientifique	1 (2004), 1 (1995)
Hasler Foundation, Switzerland	1 (2012)
Hong Kong Research Grant Council	1 (2004), 1 (1995)
Human Frontier Science Program	1 (2015), 1 (2007)
Indo-US Science & Technology Forum (IUSSTF)	1 (2009)
Institut National de la Recherche en Informatique et Automatique	1 (2010)
Israel Science Foundation	1 (2018)
Japanese Society for the Promotion of Science (JSPS)	1 (2016)
Materials and Manufacturing Ontario	1 (2003)
Michael Smith Foundation for Health Research	1 (2001)
Ministry of Science and Techn., Republic of Slovenia	1 (1992)
National Research Foundation, Singapore	2 (2007)
National Science Foundation, USA	1 (2018), 1 (2012) 1 (1997), 1 (1995), 2 (1992), 2 (1991), 1 (1990)
Natural Sciences and Engineering Council of Canada	1 (2018), 1 (2016), 1 (2012), 3 (2011), 2 (2010), 1 (2009), 2 (2008), 3 (2007), 2 (2006), 1 (2005), 3 (2004), 3 (2003), 7 (2001), 4 (2000), 4 (1998), 4 (1997), 3 (1996), 4 (1995), 1 (1990), 5 (1994), 4 (1993), 4 (1992), 3 (1991), 2 (1990), 2 (1989)
Netherlands Organisation for Scientific Research	1 (2009)
Netherlands ICT Research and Innovation Authority	1 (2010)
Research Foundation - Flanders	1 (2009), 1 (2008)

Swiss National Science Foundation 2 (2010)
Wellcome Trust 1 (2011)

7.2.8 Program Committees

- 11 Program committee *WorldHaptics Conference*
- 11 Member of the *Virtual Reality International Conference (VRIC) 2011* reviewer committee
- 10 Scientific Committee of the *ASME 2011 World Conference on Innovative Virtual Reality*
- 10 Program Committee of *Eurohaptics*
- 05,07,09,
- 08,10 Program Committee of the *IEEE International Symposium in Robot and Human Interactive Communication (RoMan)*
- 06,10 Area Chair 2006 *Robotics: Science and Systems Conference*
- 06,08,10 Program Committee of the 3rd, 4th, 5th *Symposium on Computational Models for Biomedical Simulation (ISBMS)*.
- 05,06,07,
- 08 Program Committee of the *Symposium on Haptic interfaces for virtual environment and teleoperator systems*
- 06 Program Committee of the *SICE-ICASE International Joint Conference*
- 06 Program Committee of the *IEEE Int. Workshop on Haptic Audio Visual Environments and Applications*
- 91,92,94,
- 95,97,99,
- 00,01,02,
- 03,05,06 Program Committee of the *IEEE International Conference on Robotics and Automation*
- 04,05,06 Program Committee of the *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*
- 05 Program Committee of the *2nd International Conference on Enactive Interfaces ENACTIVE05*
- 05 Program Committee of the *First International Conference on Complex Medical Engineering (CME 05)*
- 04 Program Committee of the *5th International Conference on Machine Automation (ICMA04)*
- 04 Program Committee *Sixth International Conference on Multimodal Interfaces (ICMI'04)*
- 04 Program Committee *International Symposium on Non-visual & Multimodal Visualization*
- 04 Program Committee *Second International Symposium on Medical Simulation*
- 00 Program Co-Chair *International Symposium on Robotics ISR00, Montréal*
- 98 Program Vice-Chair (North-America) of *IEEE International Conference on Robotics and Automation*
- 94,97,09 Program Committee of the *IFAC Symposium on Robot Control*
- 93 Program Committee of the *International Joint Conference on Artificial Intelligence, IJCAI'93*
- 92,94,96 Scientific Committee of the 3rd, 4th, and 5th *International Workshop on Advances in Robot Kinematics*
- 91,93,97 Program Committee of the Fifth, *Seventh and Eighth International Conference on Advanced Robotics (ICAR)*
- 92 Program Committee, *I-SAIRAS Artificial Intelligence, Robotics and Automation in Space*
- 91 Program Committee *ORIA-91, 4th Int. Symposium on Offshore, Robotics and Artificial Intelligence*
- 91,92 Program Committee of the *IEEE/RSJ International Workshop on Intelligent Robots and Systems*
- 90 Program Committee of the *Fifth IEEE International Symposium on Intelligent Control*
- 90 Program Committee of the *Third International Symposium on Robotics and Manufacturing*

7.2.9 Organization of Activities

- 2016 Organized with Jess Hartcher-O'Brien the ERC PATCH "Closing Workshop on Computational Touch", Paris, France. Speakers were Vincent Hayward, Université Pierre et Marie Curie; Jess Hartcher-O'Brien, Université Pierre et Marie Curie; Alexander Terekhov, Université Paris Descartes; Michael Wiertlewski, Université Aix-Marseille; Alessandro Moscatelli, Università degli Studi di Roma Tor Vergata; Lucile Dupin, Université Paris Descartes; Ildar Farkhatdinov, Imperial College of London; Jonathan Platkiewicz, The City College of New York; Masashi Nakatani, Hokkaido University in Sapporo; Hsin-Ni Ho, NTT Communication Science Laboratory; Mark Wexler, Université Paris Descartes; Hannah Michalska, McGill University; Malika Auvray, Université Pierre et Marie Curie; Alessandro Farné, University Lyon 1; Henrik Jörintell, Lund University; Benoni Edin, Umeå University; Sliman Bensmaia, University of Chicago; Junji Watanabe, NTT Communication Science Laboratory; Patrick Haggard, University College London; Amir Amedi, Hebrew University Jerusalem; Ophelia Deroy, University of London.
- 2016 Co-edited with Y. Visell, M. Hartmann, and N. Lepora a Special Issue on on Active Touch Sensing in Robots, Humans and Other Animals in the *IEEE Transactions on Haptics*.

- 2014 Co-edited together with N. G. Bourbakis, J. A. Gardner, N. Giudice, M. A. Heller, D. Pawluk, a Special Issue on Haptic Assistive Technology for Individuals who are Visually Impaired in the *IEEE Transactions on Haptics*.
- 2014 General Chair of Eurohaptics 2014, 24–27 June 2014, Versailles, France. Eurohaptics is a major international conference and the primary European meeting for researchers in the field of human haptics and touch enabled computer applications. This diverse field covers research in areas including human haptic perception, haptic hardware, through end-applications such as surgical simulation, rehabilitation robotics, communication, and haptic feedback for design and applied arts. Eurohaptics is part of the activities taking place under the auspices of the Eurohaptics Society. The event attracted 270 participants from Australia (12), Austria (2), Belgium (2), Brasil (1), Canada (9), China (3), Czech Republic (1), Denmark (2), Finland (3), France (47), Germany (25), India (3), Israel (1), Italy (18), Japan (47), Korea (13), the Netherlands (20), Spain (4), Switzerland (5), Turkey (3), United Kingdom (17), United States (23), as well as eleven industry sponsors.
- 2013 Co-organized with Jonathan Platkiewicz the first “Workshop on Early Touch” at the Computational Neuroscience Meeting, July 17, 2013, Université Paris Descartes, Paris, France. Speakers included Ehud Ahissar (Weizmann Institute of Science, Israel), Angelo Arleo (Université Pierre et Marie Curie, France), Sliman Bensmaia (University of Chicago, USA), Vincent Hayward (Université Pierre et Marie Curie, France), Jan Koenderink (Katholieke Universiteit Leuven, Belgium), Masashi Nakatani (Columbia University Medical Center, USA / Keio University, Japan). Tony Prescott (University of Sheffield, UK), Elie Wandersman (Université Pierre et Marie Curie, France), Junji Watanabe (NTT Communication Science Laboratories / Tokyo Institute of Technology, Japan).
- 2009 Co-edited with Kanav Kahol and Stephen Brewster a Special Issues on Ambient Haptic Systems in the *IEEE Transactions on Haptics* which appeared as the No. 3, Vol. 2. It attracted a large number of submissions among which six papers were included in the special issue and another six were accepted as regular articles.
- 2006 Co-organized, together with J. M. Hollerbach (Univ. of Utah) the *IEEE-RAS/IFRR School of Robotics Science on Haptic Interaction*. This was the third summer school offered through co-sponsorship by the IEEE Robotics and Automation Society (RAS) and the International Foundation of Robotics Research (IFRR). The school hosted 35 Ph.D/Post-doctoral students from across the world, specifically from Belgium, Canada, Italy, Japan, France, Germany, Greece, Mexico, the Netherlands, Spain, Switzerland, Turkey, the UK, and the USA who were instructed by ten internationally reknown professors from Europe, the USA, and Japan.
- 2006 Organized a colloquium, *Informatisation du graphisme tactile à l'usage des personnes aveugles ou handicapées visuelles*, Congrès de l'Association francophone pour le savoir, Montréal.
- 1989 Organized an invited paper session, *Biological Models in Robotics*. 12th Annual Conference of the IEEE Engineering in Medicine and Biology Society.
- 1989 Co-organized with O. Khatib the *First International Symposium on Experimental Robotics*, Montréal and co-founded a successful series of symposia (In 1990, seven hundred copies of the proceedings of ISER-1 were sold), one meeting every two years: Montréal, Canada, 1989; Toulouse, France; 1991, Kyoto, Japan 1993; Stanford, 1995; Barcelona, Spain, 1997; Sidney, Australia, 1999; Hawaii, USA, 2001; Sant'Angelo, Ischia, Italy, 2002; Singapour, 2004; Rio de Janeiro, 2006; Athens, 2008.
- 1989 Organized a workshop on Integration of AI and Robotics. *IEEE International Conference on Robotics and Automation*.
- 1988 Co-organized a workshop on Shared Autonomous and Teleoperated Manipulator Control. *IEEE International Conference on Robotics and Automation*.