

Wednesday March 18, Poster Session 1

Haptic Modeling and Rendering 1

Poster 1 On-Line Precomputation Algorithm for Real-Time Haptic Interaction with Non-Linear Deformable Bodies, pp. 24-29.

Filipovic, Jiri Masaryk Univ.
Peterlik, Igor Masaryk Univ.
Matyska, Ludek Masaryk Univ.

Poster 4 PhyNeSS: A Physics-Driven Neural Networks-Based Surgery Simulation System with Force Feedback, pp. 30-34.

Deo, Dhanannjay Rensselaer Pol. Inst.
De, Suvranu Rensselaer Pol. Inst.

Poster 7 Data-Driven Haptic Modeling Using Polynomial Hypersurfaces, pp. 35-38.

Theodosis, Paul Brigham Young Univ.
Colton, Mark Brigham Young Univ.

Poster 10 Computationally Efficient Techniques for Data-Driven Haptic Rendering, pp. 39-44.

Hoeber, Raphael ETH Zurich
Di Luca, Massimiliano Max Planck Inst. for Biological Cybernetics
Szekely, Gabor ETH Zurich
Harders, Matthias ETH Zurich

Collaboration and Control

Poster 13 Homotopy Switching Model for Dyad Haptic Interaction in Physical Collaborative Tasks, pp. 45-50.

Evrard, Paul CNRS/AIST
Kheddar, Abderrahmane JRL CNRS

Poster 16 Role Determination in Human-Human Interaction, pp. 51-56.

Stefanov, Nikolay Tech. Univ. München
Peer, Angelika Tech. Univ. München
Buss, Martin Tech. Univ. München

Poster 19 Maneuverability of Master Control Devices Considering the Musculo-Skeletal Model of an Operator, pp. 57-62.

Ito, Sho Kyoto Univ.
Yokokohji, Yasuyoshi Kyoto Univ.

Poster 22 Control Strategies and Perception Effects in Co-Located and Large Workspace Dynamical Encountered Haptics, pp. 63-68.

Tripicchio, Paolo Scuola Superiore S. Anna

Ruffaldi, Emanuele Scuola Superiore S.Anna
Avizzano, Carlo Alberto Scuola Superiore S. Anna
Bergamasco, Massimo Scuola Superiore S.Anna

Tactile Displays 2

Poster 25 Small and Lightweight Tactile Display and Its Application, pp. 69-74.

Kim, Seung-Chan KAIST
Yang, Tae-Heon KAIST
Han, Byung-Kil KAIST
Kim, Chong Hui Agency for Defense Development
Yang, Gi-Hun KIST
Kang, Sungchul KIST
Kwon, Dong-Soo KAIST

Poster 28 Determining Appropriate Parameters to Elicit Linear and Circular Apparent Motion Using Vibrotactile Cues, pp. 75-78.

Niwa, Masataka Osaka Univ.
Lindeman, Robert Worcester Pol. Inst.
Itoh, Yuichi Osaka Univ.
Kishino, Fumio Osaka Univ.

Poster 31 Vibrotactile Display for Hand-Held Input Device Providing Spatial and Directional Information, pp. 79-84.

Yang, Gi-Hun KIST
Ryu, Dongseok KIST
Kang, Sungchul KIST

Poster 34 Piezoelectric Actuator for a Force-Feedback Application: Preliminary Evaluation, pp. 85-90.

M'Boungui, Gaston IRCICA
Lemaire-Semail, Betty IRCICA
Giraud, Frederic IRCICA

Haptic Device Design 1

Poster 37 Compact MR-Brake with Serpentine Flux Path for Haptics Applications, pp. 91-96.

Senkal, Doruk Washington State Univ. Vancouver
Gurocak, Hakan Washington State Univ. Vancouver

Poster 40 Efficient Object Exploration and Object Presentation in TeleTA, Teleoperation System with Tactile Feedback, pp. 97-102.

Tsetserukou, Dzmitry The Univ. of Tokyo
Tachi, Susumu The Univ. of Tokyo

Poster 43 Ergonomics of Exoskeletons: Objective Performance Metrics, pp. 103-108.
Schiele, Andre European Space Agency

Poster 46 System Improvements in Mobile Haptic Interface, pp. 109-114.
Lee, In POSTECH
Hwang, Inwook POSTECH
Han, Kyung Lyong POSTECH
Choi, Oh Kyu POSTECH
Choi, Seungmoon POSTECH
Lee, Jin S. POSTECH

Perception 1

Poster 49 Effects of Haptic Device Attributes on Vibration Detection Thresholds,
pp. 115-120.
Salisbury, Curt Stanford Univ.
Gillespie, Brent Univ. of Michigan
Tan, Hong Purdue Univ.
Barbagli, Federico Stanford Univ..
Salisbury, Kenneth Stanford Univ.

Poster 52 Stiffness Discrimination with Visual and Proprioceptive Cues, pp. 121-126.
Gurari, Netta Johns Hopkins Univ.
Kuchenbecker, Katherine J. Univ. of Pennsylvania
Okamura, Allison M. Johns Hopkins Univ.

Poster 55 Measurement of the Detection Thresholds of Hair on Human Hairy Skin Using Direct Vibrotactile Stimulation, pp. 127-132.
Furukawa, Masahiro The Univ. of Electro-Communications
Nagaya, Naohisa The Univ. of Electro-Communications
Hashimoto, Yuki The Univ. of Electro-Communications
Kajimoto, Hiroyuki The Univ. of Electro-Communications
Inami, Masahiko Keio Univ.

Poster 58 Signal Manipulation Based on Perceptual Thresholds Enhances Surface Experience with Common Haptic Device, pp. 133-138.
Vicentini, Marco Univ. of Verona
Botturi, Debora Univ. of Verona

Perception 2

Poster 61 How Is Tactile Timing Information Integrated: Somatotopically or Spatiotopically?, pp. 139-144.
Kuroki, Shinobu The Univ. of Tokyo
Watanabe, Junji NTT Communication
Kawakami, Naoki The Univ. of Tokyo

Tachi, Susumu The Univ. of Tokyo

Poster 63 Evidence for Haptic Iconic Memory, pp. 145-149.

Shih, Ron Univ. of Waterloo

Dubrowski, Adam Univ. of Toronto

Carnahan, Heather Univ. of Toronto

Poster 65 Effects of Sounds on Tactile Roughness Depend on the Congruency between Modalities, pp. 150-153.

Suzuki, Yuika Tohoku Univ.

Gyoba, Jiro Tohoku Univ.

Poster 67 The Impact of Feedback Design in Haptic Volume Visualization, pp. 154-159.

Lundin Palmerius, Karljohan Linköping Univ.

Forsell, Camilla Linköping Univ.

Thursday March 19, Poster Session 2

Haptically-Enhanced Applications 2

Poster 2 Haptical Exploration of an Unsteady Flow, pp. 232-237.

Menelas, Bob CNRS-LIMSI

Ammi, Mehdi Univ. of Paris-XI

Pastur, Luc CNRS-LIMSI

Bourdot, Patrick CNRS-LIMSI

Poster 5 Development of Tremor-Suppression Filter for Meal-Assist Robot, pp. 238-243.

Ohara, Eiichi Gifu Univ.

Yano, Ken'ichi Gifu Univ.

Horihata, Satoshi Nihon Univ.

Aoki, Takaaki Gifu Univ.

Nishimoto, Yutaka Gifu Univ.

Poster 8 Method for Presenting Virtual Objects to Multiple Fingers on Two-Hands Using Multiple Single-Point Haptic Devices, pp. 244-249.

Handa, Takuya NHK (Japan Broadcasting Corp.)

Sakai, Tadahiro NHK (Japan Broadcasting Corp.)

Morita, Toshiya NHK (Japan Broadcasting Corp.)

Poster 11 Pneumatic Haptic Interface Fuzzy Controller for Simulation of Abdominal Palpations During Colonoscopy, pp. 250-255.

Cheng, Mario The Univ. of Queensland

Riek, Stephan The Univ. of Queensland

Ourselin, Sebastien Univ. Coll. London

Watson, Marcus Royal Brisbane and Women's Hospital

Passenger, Josh Royal Brisbane and Women's Hospital

Salvado, Olivier Royal Brisbane and Women's Hospital

**Device Design and Applications (Poster with demos)
(Demo room)**

Poster A Non-Contact Tactile Sensation Synthesized by Ultrasound Transducers,
pp. 256-260.

Hoshi, Takayuki Univ. of Tokyo
Iwamoto, Takayuki Canon
Shinoda, Hiroyuki Univ. of Tokyo

Poster B A High Fidelity Ungrounded Torque Feedback Device: The Itorqu 2.0,
pp. 261-266.

Winfrey, Kyle N. Univ. of Pennsylvania
Gewirtz, Jamie Univ. of Pennsylvania
Mather, Thomas Univ. of Pennsylvania
Fiene, Jonathan Univ. of Pennsylvania
Kuchenbecker, Katherine J. Univ. of Pennsylvania

Poster C Toward Iconic Vibrotactile Information Display Using Floor Surfaces,
pp. 267-272.

Visell, Yon McGill Univ.
Law, Alvin McGill Univ.
Cooperstock, Jeremy R. McGill Univ.

Poster D The Ultimate Haptic Device: First Step, pp. 273-278.

Millet, Guillaume Univ. Pierre et Marie Curie-Paris 6
Haliyo, Dogan Sinan Univ. Pierre et Marie Curie-Paris 6
Régnier, Stéphane Univ. Pierre et Marie Curie-Paris 6
Hayward, Vincent Univ. Pierre et Marie Curie-Paris 6

**Poster E Toward Tactilely Transparent Gloves: Collocated Slip Sensing and
Vibrotactile Actuation,** pp. 279-284.

Romano, Joseph M. Univ. of Pennsylvania
Gray, Steven R. Univ. of Pennsylvania
Jacobs, Nathan T. Univ. of Pennsylvania
Kuchenbecker, Katherine J. Univ. of Pennsylvania

Tactile Displays 3

Poster 14 Good Vibrations: Asymmetric Vibrations for Directional Haptic Cues,
pp. 285-289.

Tappeiner, Hanns Carnegie Mellon Univ.
Klatzky, Roberta Carnegie Mellon Univ.
Unger, Bertram Carnegie Mellon Univ.

Hollis, Ralph Carnegie Mellon Univ.

Poster 17 Dielectric Elastomer Actuators for Tactile Displays, pp. 290-295.

Matysek, Marc Tech. Univ. Darmstadt

Lotz, Peter Tech. Univ. Darmstadt

Winterstein, Thomas Tech. Univ. Darmstadt

Schlaak, Helmut F. Tech. Univ. Darmstadt

Poster 20 Tactile Object Exploration Using Cursor Navigation Sensors, pp. 296-301.

Kraft, Dirk Univ. of Southern Denmark

Bierbaum, Alexander Univ. of Karlsruhe (TH)

Kjaergaard, Morten Univ. of Southern Denmark

Ratkevicius, Jurgis Univ. of Southern Denmark

Kjær-Nielsen, Anders Univ. of Southern Denmark

Ryberg, Charlotte Univ. of Southern Denmark

Petersen, Henrik Gordon Univ. of Southern Denmark

Asfour, Tamim Univ. of Karlsruhe (TH)

Dillmann, Rüdiger Univ. of Karlsruhe (TH)

Krüger, Norbert Univ. of Southern Denmark

Poster 23 Vibrotactile Score: A Score Metaphor for Designing Vibrotactile Patterns, pp. 302-307.

Lee, Jaebong POSTECH

Ryu, Jonghyun POSTECH

Choi, Seungmoon POSTECH

Dynamics and Control 1

Poster 26 An Adaptive Controller for Bilateral Teleoperation under Time Delay, pp. 308-313.

Shahdi, Ali McMaster Univ.

Sirouspour, Shahin McMaster Univ.

Poster 29 Control of an Actuated Car Door Providing Outstanding Haptic Interaction, pp. 314-319.

Strolz, Michael Tech. Univ. München

Mörrtl, Alexander Tech. Univ. München

Graef, Michael BMW Forschung und Tech. GmbH

Buss, Martin Tech. Univ. München

Poster 32 An Energy Bounding Approach for Directional Transparency in Multiple Degree-Of-Freedom Haptic Interaction, pp. 320-325.

Kim, Jaeha Gwangju Inst. of Science and Tech.

Kim, Jong-Phil Korea Inst. of Science and Tech.

Seo, Changhoon Gwangju Inst. of Science and Tech.

Ryu, Jeha Gwangju Inst. of Science and Tech.

Poster 35 Recovering Haptic Performance by Relaxing Passivity Requirements,
pp. 326-331.
Griffiths, Paul Johns Hopkins Univ.
Gillespie, Brent Univ. of Michigan

Human Performance 1

Poster 38 Progressive Shared Control for Training in Virtual Environments,
pp. 332-337.
Li, Yanfang Rice Univ.
Huegel, Joel C. Rice Univ.
Patoglu, Volkan Sabanci Univ.
O'Malley, Marcia Rice Univ.

**Poster 41 Performance Related Energy Exchange in Haptic Human-Human Interaction
in a Shared Virtual Object Manipulation Task,** pp. 338-343.
Feth, Daniela Tech. Univ. München
Groten, Raphaela Tech. Univ. München
Peer, Angelika Tech. Univ. München
Hirche, Sandra Tech. Univ. München
Buss, Martin Tech. Univ. München

Poster 44 Effects of Magnitude and Phase Cues on Human Motor Adaptation,
pp. 344-349.
Israr, Ali Rice Univ.
Kapson, Hakan Sabanci Univ.
Patoglu, Volkan Sabanci Univ.
O'Malley, Marcia Rice Univ.

Poster 47 Vibrotactile Perception Assessment for a Rowing Training System,
pp. 350-355.
Ruffaldi, Emanuele Scuola Superiore S. Anna
Filippeschi, Alessandro Scuola Superiore S. Anna
Sandoval, Oscar Scuola Superiore S. Anna
Frisoli, Antonio Scuola Superiore S. Anna
Avizzano, Carlo Alberto Scuola Superiore S. Anna
Bergamasco, Massimo Scuola Superiore S. Anna

Human Performance 2

Poster 50 Haptics As an Aid to Copying for People with Williams Syndrome,
pp. 356-361.
Lee, Jin Johns Hopkins Univ.
Okamura, Allison M. Johns Hopkins Univ.
Landau, Barbara Johns Hopkins Univ.

Poster 53 Improving Haptic Experience through Biomechanical Measurements,
pp. 362-367.

Kocherry, John SUNY, Univ. at Buffalo
Srimathveeravalli, Govindarajan SUNY, Univ. at Buffalo
Chowriappa, Ashirwad SUNY, Univ. at Buffalo
Kesavadas, Thenkurussi SUNY, Univ. at Buffalo
Shin, Gwanseob SUNY, Univ. at Buffalo

Poster 56 Toward a Robot-Assisted Assessment of the Control Processes of the Motor System, pp. 368-373.

Méary, David San Raffaele Vita-Salute Univ.
Baud-bovy, Gabriel San Raffaele Vita-Salute Univ.

Poster 59 An HMM Approach to Realistic Haptic Human-Robot Interaction,
pp. 374-379.

Wang, Zheng Tech. Univ. München
Peer, Angelika Tech. Univ. München
Buss, Martin Tech. Univ. München

Friday March 20, Poster Session 3

Haptic Modeling and Rendering 3

Poster 3 Designing 6DOF Haptic Transfer Functions for Effective Exploration of 3D Diffusion Tensor Fields, pp. 470-475.

Ogawa, Yuta Tohoku Univ.
Fujishiro, Issei Tohoku Univ.
Suzuki, Yasuko Tohoku Univ.
Takeshima, Yuriko Tohoku Univ.

Poster 6 Improved Feature Detection Over Large Force Ranges Using History Dependent Transfer Functions, pp. 476-481.

Bivall Persson, Petter Linköping Univ.
Höst, Gunnar E. Linköping Univ.
Cooper, Matthew David Linköping Univ.
Tibell, Lena Anna Elisabet Linköping Univ.
Ynnerman, Anders Linköping Univ.

Poster 9 Dynamic Coupling Haptic Suturing Based on Orthogonal Decomposition,
pp. 482-487.

Sepulveda-Cervantes, Gabriel CIDETEC-IPN
Parra Vega, Vicente Cinvestav
Dominguez-Ramirez, Omar Arturo Hidalgo State Univ.

Poster 12 Bilateral Energy Transfer for High Fidelity Haptic Telemanipulation,

pp. 488-493.

Artigas, Jordi DLR - German Aerospace Center

Borghesan, Gianni Univ. of Bologna

Preusche, Carsten DLR - German Aerospace Center

Melchiorri, Claudio Univ. of Bologna

Hirzinger, Gerd DLR - German Aerospace Center

Perception and Design

Poster 15 Assessment of Haptics-Based Interaction for Assembly Tasks in Virtual Reality, pp. 494-499.

Vo, Dao Iowa State Univ.

Vance, Judy Iowa State Univ.

Marasinghe, Mervyn Iowa State Univ.

Poster 18 Multidimensional Visual Aid Enhances Haptic Training Simulations,

pp. 500-504.

Halabi, Osama Iwate Univ.

Chiba, Norishige Iwate Univ.

Poster 21 Perceptually Augmented Simulator Design through Decomposition,

pp. 505-510.

Edmunds, Timothy Rutgers Univ.

Pai, Dinesh K. Univ. of British Columbia

Poster 24 Performance Improvement with Haptic Assistance: A Quantitative Assessment, pp. 511-516.

Gunn, Chris Commonwealth Scientific Industrial Res. Org.

Datta, Amitava Univ. of Western Australia

Muller, Warren Commonwealth Scientific Industrial Res. Org.

Haptic Device Design 3

Poster 27 Extending the Motion Ranges of Magnetic Levitation for Haptic Interaction,

pp. 517-522.

Berkelman, Peter Univ. of Hawaii-Manoa

Dzadovsky, Michael Univ. of Hawaii-Manoa

Poster 30 Design and Modeling of a Novel Haptic Device, pp. 523-528.

Tang, Zhouming Simon Fraser Univ.

Payandeh, Shahram Simon Fraser Univ.

Poster 33 Variable Resistance Hand Device Using an Electro-Rheological Fluid Damper,

pp. 529-534.

Weinberg, Brian Northeastern Univ.

Khanicheh, Azadeh Northeastern Univ.

Sivak, Mark Northeastern Univ.
Unluhisarcikli, Ozer Northeastern Univ.
Morel, Guillaume Univ. Pierre et Marie Curie - Paris 6
Shannon, James WGI Inc.
Kelliher, John WGI Inc.
Sabadosa, Michael WGI Inc.
Bonmassar, Giorgio Massachusetts General Hospital
Patriiti, Benjamin Spaulding Rehabilitation Hospital
Bonato, Paolo Spaulding Rehabilitation Hospital
Mavroidis, Constantinos Northeastern Univ.

Poster 36 Design of a New Fmri Compatible Haptic Interface, pp. 535-540.

Li, Siqiao Scuola Superiore S.Anna
Frisoli, Antonio Scuola Superiore S.Anna
Borelli, Luigi Federico Scuola Superiore S.Anna
Bergamasco, Massimo Scuola Superiore S.Anna
Raabe, Markus Univ. of Regensburg
Greenlee, Mark W. Univ. of Regensburg

Dynamics and Control 2

Poster 39 Passive Set-Position Modulation Approach for Haptics with Slow, Variable, and Asynchronous Update, pp. 541-546.

Lee, Dongjun Univ. of Tennessee-Knoxville
Huang, Ke Univ. of Tennessee-Knoxville

Poster 42 Improving Transparency in Network-Based Haptics, pp. 547-552.

Niakosari, Sina McMaster Univ.
Sirouspour, Shahin McMaster Univ.

Poster 45 Remote Dynamic Proxies for Wave-Based Peer-To-Peer Haptic Interaction, pp. 553-558.

Li, Zhi Univ. of Victoria
Constantinescu, Daniela Univ. of Victoria

Poster 48 Performance of Equivalent Frequency-Dependent Damping, pp. 559-564.

Lim, Yo-An Gwangju Inst. of Science and Tech.
Ahn, Hyo-Sung Gwangju Inst. of Science and Tech.
Ryu, Jeha Gwangju Inst. of Science and Tech.

Perception 4

Poster 51 Finger Force of Exploratory Movements Is Adapted to the Compliance of Deformable Objects, pp. 565-569.

Kaim, Lukas Univ. of Giessen
Drewing, Knut Univ. of Giessen

Poster 54 Quantifying Perception of Nonlinear Elastic Tissue Models Using Multidimensional Scaling, pp. 570-575.

Misra, Sarthak The Johns Hopkins Univ.
Fuernstahl, Philipp ETH Zurich
Ramesh, K. T. The Johns Hopkins Univ.
Okamura, Allison M. The Johns Hopkins Univ.
Harders, Matthias ETH Zurich

Poster 57 A Model of Perception of the Center of Elastic Force Fields, pp. 576-581.

Bocca, Francesca San Raffaele Vita-Salute Univ.
Baud-bovy, Gabriel San Raffaele Vita-Salute Univ.

Poster 60 The Equivalence of Vision and Haptics When Matched Spatiotemporally, pp. 582-586.

Symmons, Mark Monash Univ.
Richardson, Barry Monash Univ.

Tactile Modeling

Poster 62 Influence of Contact Conditions on Thermal Responses of the Hand, pp. 587-592.

Galie, Jessica MIT
Ho, Hsin-Ni NTT
Jones, Lynette MIT

Poster 64 Providing Two-Dimensional Tactile Directional Information with One-Dimensional Movement, pp. 593-598.

Lylykangas, Jani Kristian Univ. of Tampere
Surakka, Veikko Univ. of Tampere
Rantala, Jussi Univ. of Tampere
Raisamo, Roope Univ. of Tampere

Poster 66 A 2D Haptic Glyph Method for Tactile Arrays: Design and Evaluation, pp. 599-604.

Borst, Christoph Univ. of Louisiana at Lafayette
Baiyya, Vijay Univ. of Louisiana at Lafayette

Poster 68 Virtual Active Touch: Perceived Roughness through a Pointing-Stick-Type Tactile Interface, pp. 605-610.

Yamauchi, Takahiro Tohoku Univ.
Konyo, Masashi Tohoku Univ.
Okamoto, Shogo Tohoku Univ.
Tadokoro, Satoshi Tohoku Univ.