Third International Conference on Cable-Driven Parallel Robots (CableCon2017) Program

Note: The locations of the events are indicated between parentheses. See the table at the end of the program for the details of the locations.

Tuesday, August 1
17:00 Registration and welcome gathering (VCH-Atrium)
18:00 Buffet with sandwiches, salads, drinks etc (VCH-Atrium)

Wednesday, August 2
08:15 Registration (GHK-2320)
08:40 Opening remarks (GHK-2320)
08:50 Keynote address I: Cable-driven and Parallel-actuated Robots for Training of Human Gait, Posture, and Balance (S. Agrawal, Columbia University, GHK-2320)
Displacement Analysis I (GHK-2320)

sessions chair: Marco Carricato, Università di Bologna

09:50 Direct Kinematics of CDPR with Extra Cable Orientation Sensors: the 2 and 3 Cables Case with Perfect Measurement and Ideal or Elastic Cables (J.-P. Merlet)
10:10 Improving the Forward Kinematics of Cable-Driven Parallel Robots Through Cable Angle Sensors (X. Garant, A. Campeau-Lecours, P. Cardou, C. Gosselin)
10:30 Coffee break
Modelling I (GHK-2320)

*session chair: Marc Arsenault, Laurentian University*

10:50 Manipulator Deflection for Optimum Tension of Cable-Driven Robots with Parameter Variations (L. Notash)

11:10 Sensitivity Analysis of the Elasto-Geometrical Model of Cable-Driven Parallel Robots (S. Baklouti, S. Caro, É. Courteille)

11:30 CASPR-ROS: A Generalised Cable Robot Software in ROS for Hardware (J. Eden, C. Song, Y. Tan, D. Oetomo, D. Lau)

12:00 Lunch (ABP-Cafeteria)

Trajectory Planning and Control I (GHK-2320)

*session chair: Hamid Taghirad, K. N. Toosi University of Technology*

13:30 Rest-to-Rest Trajectory Planning for Planar Underactuated Cable-Driven Parallel Robots (E. Idà, A. Berti, T. Bruckmann, Marco Carricato)

13:50 Dynamically-Feasible Elliptical Trajectories for Fully Constrained 3-DOF Cable-Suspended Parallel Robots (G. Mottola, C. Gosselin, M. Carricato)

14:10 Dynamic Transition Trajectory Planning of Three-dof Cable-Suspended Parallel Robots (X. Jiang, C. Gosselin)

14:30 Coffee break

Applications I (GHK-2320)

*session chair: Andreas Pott, Fraunhofer IPA*

14:50 Preliminary Running and Performance Test of the Huge Cable Robot of FAST Telescope (H. Li, J. Sun, G. Pan, Q. Yang)


15:30 Inverse Kinematics for a Novel Rehabilitation Robot for Lower Limbs (A. Badi, M. Saad, G. Gauthier, P. Archambault)
Social Activities
16:00 Quebec City tour by bus (departure from Telus Stadium parking lot)
18:00 Dinner (Château Frontenac, Bellevue room)

Thursday, August 3
Displacement Analysis II (GHK-2320)

session chair: Jean-Pierre Merlet, INRIA Sophia Antipolis

08:50 A New Approach to the Direct Geometrico-Static Problem of Cable Suspended Robots Using Kinematic Mapping (M. Husty, J. Schadlbauer, P. Zsombor-Murray)

09:10 Initial Length and Pose Calibration for Cable-Driven Parallel Robots with Relative Length Feedback (D. Lau)

09:30 Static Analysis and Dimensional Optimization of a Cable-Driven Parallel Robot (M. Newman, A. Zygielbaum, B. Terry)

Modelling II (GHK-2320)

session chair: Leila Notash, Queen’s University

09:50 Assumed-Mode-Based Dynamic Model for Cable Robots with Non-Straight Cables (J. I. Ayala Cuevas, E. Laroche, O. Piccin)

10:10 Modelling of Flexible Cable-Driven Parallel Robots using a Rayleigh-Ritz Approach (H. A. Godbole, R. J. Caverly, J. Forbes)

10:30 Coffee break

Workspace Analysis (GHK-2320)

session chair: Marc Gouttefarde, CNRS and LIRMM

10:50 Determination of the Cable Span and Cable Deflection of Cable-Driven Parallel Robots (A. Pott)
11:10 Geometric Determination of the Cable-Cylinder Interference Regions in the Workspace of a Cable-Driven Parallel Robot (A. Martin, S. Caro, P. Cardou)

11:30 Twist Feasibility Analysis of Cable-Driven Parallel Robots (S. Lessanibahri, M. Gouttefarde, S. Caro, P. Cardou)

12:00 Lunch (ABP-Cafeteria)

**Trajectory Planning and Control II (GHK-2320)**

*session chair: Tobias Bruckmann, Universit"at Duisburg-Essen*

13:30 Transverse Vibration Control in Planar Cable-Driven Robotic Manipulators (M. Rushton, A. Khajepour)

13:50 Application of a Differentiator-Based Adaptive Super-Twisting Controller for a Redundant Cable-Driven Parallel Robot (C. Schenk, C. Masone, H. Bülthoff, A. Pott)

14:10 Randomized Kinodynamic Planning for Cable-Suspended Parallel Robots (R. Bordalba, J. M. Porta, L. Ros)

14:30 Coffee break

**Design (GHK-2320)**

*session chair: Stéphane Caro, CNRS and LS2N*


15:10 On Improving Stiffness of Cable Robots (C. Nelson)

15:30 Optimal Design of a High-Speed Pick-and-Place Cable-Driven Parallel Robot (Z. Zhang, Z. Shao, L. Wang, A. J. Shih)
Social Activities

16:00 Guided visit of the Huron-Wendat Museum (departure from Telus Stadium parking lot)

17:30 Cocktail reception (Hôtel-Musée Premières Nations)

18:30 Conference banquet (Restaurant la Traite)

21:30 Return to campus (800/801 bus station)

Friday, August 4

08:30 Keynote address II: Cable Modelling for Large Cable Robots (M. Nahon, McGill University, GHK-2320)

Modelling III (GHK-2320)

session chair: Darwin Lau, Chinese University of Hong Kong

09:30 A Polymer Cable Creep Modeling for a Cable-Driven Parallel Robot in a Heavy Payload Application (J. Piao, X. Jin, E.-P. Choi, J.-O. Park, C.-S. Kim, J. Jung)

09:50 Bending Fatigue Strength and Lifetime of Fiber Ropes (M. Wehr, A. Pott, K.-H. Wehking)

10:10 Bending Cycles and Cable Properties of Polymer Fiber Cables for Fully Constrained Cable-Driven Parallel Robots (V. Schmidt, A. Pott)

10:30 Coffee break

Tension Distribution (GHK-2320)

session chair: Juan Antonio Carretero, University of New Brunswick


11:10 Tension Distribution Algorithm for Mobile Cable-Driven Parallel Robots (T. Rasheed, P. Long, D. Marquez-Gamez, S. Caro)
11:30 Improvement of cable tension observability through a new cable driving unit design (M. Rognant, É. Courteille)

12:00 Lunch (ABP-Cafeteria)

Applications II (GHK-2320)

*session chair: Carl Nelson, University of Nebraska-Lincoln*

13:30 On the Design of a Novel Cable-Driven Parallel Robot Capable of Large Rotation About One Axis (A. Fortin-Côté, C. Faure, L. Bouyer, B. J. McFadyen, C. Mercier, D. Laurendeau, M. Bonenfant, P. Cardou, C. Gosselin)

13:50 Concept Studies of Automated Construction Using Cable-Driven Parallel Robots (T. Bruckmann, C. Reichert, M. Meik, P. Lemmen, A. Spengler, H. Mattern, M. König)

14:10 Design and Analysis of a Novel Cable-Driven Haptic Master Device for Planar Grasping (K. Jadhao, P. Lambert, T. Bruckmann, J. L. Herder)

14:30 Coffee break

14:50 **Tour of the Laboratoire de robotique** (departure from GHK-2320, rooms PLT-3702, PLT-00370, PLT-00136)

16:30 Closing remarks (PLT-Main hall)
### Campus Map

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<th>Abitibi-Price Building</th>
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<td>GHK:</td>
<td>Gene-H.-Kruger Building</td>
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<td>VCH:</td>
<td>Alexandre-Vachon Building</td>
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#### Odonymes des voies
- Rue du PEPS
- Rue de la Terrasse
- Rue des Sports
- Rue de l'Agriculture
- Rue de l'Université
- Rue des Sciences-de-l'Éducation
- Rue des Bibliothèques
- Rue des Arts
- Rue de la Vie-Étudiante
- Boulevard Laurier
- Rue de la Loire
- Avenue des Serres
- Avenue des Sciences-de-la-Vie
- Avenue des Sciences-Humaines
- Avenue du Séminaire
- Rue Liénard
- Boulevard René-Lévesque Ouest
- Rue de la Vendée
- Rue des Forêts
- Avenue Myrand
- Av. des Tours

#### Plans et cours d'eau

#### Espaces Verts et Récréatifs
- Espaces verts boisés
- Espaces verts gazonnés
- Installations sportives
- Jardins communautaires
- Parcelles expérimentales
- Plans et cours d'eau

#### Limites
- Campus universitaire
- Espaces bâtis
- Bâtiments existants
- Espaces de circulation
  - Réseau piétonnier et cyclable
  - Réseau routier
  - Stationnements de surface

#### Numerotation des bâtiments

#### Carte 3

#### 800/801 bus stop
- Le Point (information)
- Telus Stadium
- parking lot

#### 800/801 bus towards hotels, shopping malls
- 800/801 bus towards Old Québec

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**UNIVERSITÉ LAVAL**
From Château Frontenac to Campus

800/801 bus stop
800/801 bus

towards campus