

CLAWAR

September 10-12, 2018  PANAMA CITY, PA

Technical Programme

Organized by:



Sponsored by:



Day 1 – Monday 10 September 2018

- OPENING OF CONFERENCE
- *Keynote Address 1 – Xie Ming*
- Session 1.A-1: Robotics for assistance and rehabilitation - I
- Session 1.A-2: Climbing and inspection robots
- Session 1.A-3: Multirobots and cooperative systems: navigation and control
- Session 1.B-1: Cleaning and inspection Robots
- Session 1.B-2: Special session on robotics in education and education in robotics
- *CLAWAR Association Annual General Meeting*

Day 2 – Tuesday 10 September 2018

- *Keynote Address 2 – Krzysztof Kozłowski*
- Session 2.A-1: Robotics for assistance and rehabilitation - II
- Session 2.A-2: Biologically-inspired systems and solutions
- Session 2.B-1: Legged robots and legged locomotion
- Session 2.B-2: Perception and manipulation
- Session 2.B-3: Designs for biomedical applications
- *Traditional Panamanian Folkloric Dance Presentation*
- *Conference Banquet – Hotel El Panamá*

Day 3 – Tuesday 10 September 2018

- Social programme
 - Visit to the Panama Canal – Group 1
 - Visit to the Panama Canal – Group 2
- Laboratory tour and a brief tour around the campus with a historical interest.
- CLOSURE

Welcome to CLAWAR 2018

It is our pleasure to welcome you all to the CLAWAR 2018 conference, held in Panama City, Rep. of Panama during 10 – 12 September 2018. CLAWAR 2018 is the 21st edition of the International Conference series on Climbing and Walking Robots and the Support Technologies for Mobile Machines. The technical conference includes three keynote presentations, given by well-known scientists in their fields of research, and 49 original articles and 3 plenary presentations with cutting-edge scientific findings in a wide range of topics related to the rapidly evolving areas of robotics and their support technologies. We hope that CLAWAR 2018 will enable delegates to exchange research ideas and to establish collaborative networks for the advancement of science and knowledge discovery in the field of robotics and associated technologies.

In this conference, as usual, we are offering a hard copy of the technical programme for the delegates. In addition, the delegates will receive a soft copy of the conference proceedings. The CLAWAR 2018 articles will be in open access and will be indexed in Scopus.

The social programme of the conference, on the evening of Tuesday 11th September, includes a conference banquet, in one of the exclusive hotels in Panama City, where the participants will be able to have a taste of traditional Panamanian cuisine. We hope that this will meet the delegates' expectation of CLAWAR 2018 and of the Panamanian hospitality.

There will also be tours arranged to visit robotics research laboratories and a brief tour around the campus with a historical interest at the Technological University of Panama during the morning of Wednesday 12th September. In parallel, with a brief time-lag, there will also be tours arranged to visit the Panama Canal. To achieve these ends, the participants will be split into two groups.

Finally, if you have queries or require any assistance please do not hesitate to approach the conference collaborators or members of the conference organising team. We wish you all a successful and fruitful CLAWAR 2018 conference and hope you enjoy the event from both technical and social aspects.

Héctor Montes, Roemi Fernández, Víctor Sánchez and Manuel Armada
General Co-Chairs - CLAWAR 2018

Day 1
Monday 10 September 2018

08:00-09:00	Arrival and Registration (Auditorium Hall)
09:00-09:30	Opening of Conference (Auditorium)

Keynote Address – 1		Paper ID
Session Chair: Giovanni Muscato		PL1
Venue: Auditorium		
09:30-10:30	Humanoid Robot: A Review of Our Research Works <i>Xie Ming</i>	

10:30-11:00	Coffee Break	Venue: Auditorium Hall
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Session 1.A-1: Robotics for assistance and rehabilitation – I		
Session Chair: Khaled Goher		
Time: 11:00-12:20		Venue: Room 301
Time	Paper ID	Presentation
11:00-11:20	1	System Identification and HSDBC-Optimized PID Control of a Portable Lower-Limb Rehabilitation Device <i>Sulaiman Fadlallah and Khaled Goher</i>
11:20-11:40	12	Proposal of Air Compressing Device using Walking Vibration Energy Regeneration for Pneumatic Driven Assistive Device <i>Manabu Okui, Yasuyuki Yamada and Taro Nakamura</i>
11:40-12:00	20	Rehabilitation prototype to improves mobility of acute rotator cuff injury <i>Mariana Torrente Rocha, Laura Jiménez Guzmán and Hernando León-Rodríguez</i>
12:00-12:20	29	Standing Assistance that considers user posture tolerance <i>Masahiro Yokota, Shohei Kawazoe, Daisuke Chugo, Sho Yokota and Hiroshi Hashimoto</i>

Session 1.A-2: Climbing and inspection robots		
Session Chair: Gurvinder S. Virk		
Time: 11:00-12:20		Venue: Room 302
Time	Paper ID	Presentation
11:00-11:20	11	Traveling-Wave-Type Wall-Climbing Robot for Airplane Surface Inspection <i>Daiki Hagiwara, Naoaki Tadami, Takafumi Amakawa, Yasuyuki Yamada And Taro Nakamura</i>
11:20-11:40	14	Stable Cliff Climbing for Hexapod Robot with Articulated Body <i>Aleksei Panchenko and Vladimir Pavlovsky</i>
11:40-12:00	38	Moor chain climbing robot for NDT inspection applications <i>Matthew Kimball, Gurvinder Singh Virk and Tariq Sattar</i>
12:00-12:20	42	Magneto static analysis of adhesion force for the wall climbing robot <i>Shyamal Mondal and Z Fallows</i>

Session 1.A-3: Multirobots and cooperative systems: navigation and control		
Session Chair: M. Osman Tokhi		
Time: 11:00-12:20		Venue: Room 304
Time	Paper ID	Presentation
11:00-11:20	30	Navigation of Quadruped Multirobots by Gesture Recognition using Restricted Boltzmann Machines <i>Arata Andrade Saraiva, Domingos Bruno Sousa Santos, Jose Vigno Moura Sousa, Francisco Das Chagas Fontenele Marques Junior, N.M. Fonseca Ferreira and Antonio Valente</i>
11:20-11:40	31	Scalable Task Cleanup Assignment for Multi-Agents <i>Arata Andrade Saraiva, Nator Júnior Carvalho Da Costa Da Costa, Thelmo Pontes De Araújo de Araújo, José Vigno Mora Sousa, Nuno Ferreira and Antonio Valente</i>
11:40-12:00	51	Coordinated Control for Vehicles Cooperative Maneuvers using Distributed Model Predictive Control <i>Andoni Urtegui, Ray Alejandro Lattarulo and Gerardo Fernández-López</i>
12:00-12:20	53	Indoor Localization of Mobile Robots with Wireless Sensor Network Based on Ultra Wideband using

		Experimental Measurements of Time Difference of Arrival <i>Ousmane Oumar, Tariq Sattar and Mohammad Osman Tokhi</i>
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12:30-14:00	Lunch	Venue: (Postgraduate Building Cafeteria)
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Session 1.B-1: Cleaning and Inspection Robots		
Session Chair: Valery Gradetsky		
Time: 14:00-15:40		Venue: Room 301
Time	Paper ID	Presentation
14:00-14:20	2	Prospects and possibilities of using thermomechanical microrobots for solving technological tasks in space <i>Valery Gradetsky, Andrey Zhukov, Nikolay Bolotnik, Vladislav Chashchukhin, Dmitry Kozlov and Igor Smirnov</i>
14:20-14:40	10	Development of a peristaltic crawling motion type duct cleaning robot compatible with cleaning joint efficiency and running speed by cleaning joint <i>Takahiko Kawaguchi, Yuki Tanise, Masasi Kamata, Yasuyuki Yamada and Taro Nakamura</i>
14:40-15:00	17	Towards safe inspection of long weld lines on ship hulls using an autonomous robot <i>Gabriela Gallegos Garrido, Tariq Sattar, Michael Corsar, Richard James and Djelloul Seghier</i>
15:00-15:20	32	Miniature magnetic robots for in-pipe locomotion <i>George Mills, Jason Liu, Bilal Kaddouh, Andrew Jackson and Robert Richardson</i>
15:20-15:40	44	Develop a sensor based robot for railway inspection <i>Nathan Western and Shyamal Mondal</i>

Session 1.B-2: Special session on robotics in education and education in robotics		
Session Chair: Dimitris Chrysostomou		
Time: 14:00-15:40		Venue: Room 302
Time	Paper ID	Presentation
14:00-14:20	7	Educational mobile robots in cloud-based framework for laboratory environment <i>Nuno Ferreira, Atef A. Ata and Yury Korobov</i>
14:20-14:40	15	Proposal of a Low Cost High Performance Educational Mobile Robot: An RPI and Arduino Approach <i>José Gonçalves, André Pinto, Vítor Hugo Pinto and Paulo Costa</i>
14:40-15:00	24	Educational Humanoid Robot using a sensoring fusion through Arduino <i>Jessica P. M. Vital, Nuno M. Fonseca and António Valente</i>
15:00-15:20	25	NAO robot as a domestic robot <i>Jessica Patrícia Madureira Vital, Nuno Ferreira and Antonio Valente</i>
15:20-15:40	37	Educational Bandwidth Traffic Prediction using Non-Linear Autoregressive Neural Networks <i>Shwan Dyllon, Timothy Hong, Ousmane Abdoulaye Oumar and Perry Xiao</i>

15:40-16:10	Coffee Break	Venue: Auditorium Hall
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CLAWAR Association AGM	
Venue: Auditorium	
16:10-16:40	CLAWAR Association Annual General Meeting <i>Gurvinder S. Virk</i>

Day 2
Tuesday 11 September 2018

08:00-09:00	Arrival and Registration (Auditorium Hall)
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Keynote Address – 2 Session Chair: Bryan Bridge Venue: Auditorium	Paper ID
	PL2

09:00-10:00	Local and Global Artificial Potential Functions in the Control of Mobile Robots <i>Krzysztof Kozłowski</i>
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CLAWAR Association Report Venue: Auditorium	
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10:00-10:30	CLAWAR Association Report <i>Gurvinder S. Virk</i>
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10:30-11:00	Coffee Break	Venue: Auditorium Hall
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Session 2.A-1: Robotics for assistance and rehabilitation - II Session Chair: Giovanni Muscato	
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Time: 11:00-12:20	Venue: Room 301
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Time	Paper ID	Presentation
11:00-11:20	6	Design of a system to support the mobility of visually impaired people <i>Hector Montes, Ignacio Chang, Guelda Carballada, Jose Muñoz, Antony Garcia, Rafael Vejarano and Yessica Saez</i>
11:20-11:40	22	A walking assistant using brakes and low cost sensors <i>Luciano Cantelli, Dario Calogero Guastella, Domenico Longo, Luciano Mangiameli, Carmelo Donato Melita and Giovanni Muscato</i>
11:40-12:00	28	Assistive Wheelchair Caster Unit for Step Climbing - Improvement of step detection method – <i>Sho Yokota, Akihiro Matsumoto, Daisuke Chugo and Hiroshi Hashimoto</i>
12:00-12:20	50	Kinetic analysis of an ankle rehabilitator composed of two parallel delta robots <i>Miguel Angel Pérez Bayas, Geovanny Guillermo Novillo Andrade, Socrates Miguel Aquino Arroba and Javier Gavilanes</i>

Session 2.A-2: Biologically-inspired systems and solutions		
Session Chair: Gurvinder Virk		
Time: 11:00-12:20		Venue: Room 302
Time	Paper ID	Presentation
11:00-11:20	3	Distributed driving system for the excavation unit of a lunar earthworm-type “leavo” excavation robot <i>Ami Fujiwara, Toyoharu Nakatake, Naoaki Tadami, Keita Isaka, Yasuyuki Yamada, Taro Nakamura, Hirotaka Sawada and Takashi Kubota</i>
11:20-11:40	9	Propulsion unit based on earthworm setae for underwater excavation robot <i>Naoaki Tadami, Keita Isaka, Toyoharu Nakatake, Ami Fujiwara, Yasuyuki Yamada, Taro Nakamura, Makoto Sugawara and Hiroshi Yoshida</i>
11:40-12:00	19	Development the electronic system of continues modular snake-like-robot <i>Daniel Armando Gómez, Javier Camilo Torres Vera and Hernando León-Rodríguez</i>
12:00-12:20	21	Bio-inspired quadruped robot for detection carbon dioxide in the air <i>María Camila Rojas, Santiago Noriega Álvarez and Hernando León-Rodríguez</i>

12:30-14:00	Lunch	Venue: (Postgraduate Building Cafeteria)
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Session 2.B-1: Legged robots and legged locomotion		
Session Chair: Khaled Goher		
Time: 14:00-16:00		Venue: Room 301
Time	Paper ID	Presentation
14:00-14:20	8	Body design of tendon-driven jumping robot using single actuator and wire set <i>Takashi Takuma, Koki Takai, Yuki Iwakiri and Wataru Kase</i>
14:20-14:40	13	SLIDER: A Bipedal Robot with Knee-less Legs and Vertical Hip Sliding Motion <i>Ke Wang, Aksat Shah and Petar Kormushev</i>

14:40-15:00	16	Optimization of Feedback Control Inputs for Posture Control of a Six-legged Robot <i>Hiroaki Uchida</i>
15:00-15:20	26	Interactive Co-Design of Form and Function for Legged Robots using the Adjoint Method <i>Ruta Desai, Beichen Li, Ye Yuan and Stelian Coros</i>
15:20-15:40	33	Stable walking dynamics in an underactuated biped <i>Carlos Francisco Rodriguez Herrera, Juan Camilo Martinez Franco and Sebastian Murillo Herrera</i>
15:40-16:00	34	A scalable, modular leg design for multi-legged stair climbing robots <i>Timothee Buettner, Dominik Wilke, Arne Roennau, Georg Heppner and Ruediger Dillmann</i>

Session 2.B-2: Perception and manipulation		
Session Chair: Roemi Fernández		
Time: 14:00-16:00		Venue: Room 302
Time	Paper ID	Presentation
14:00-14:20	23	Real time camera homography error modelling for sensorial data fusion <i>Rony Caballero and Aranzazu Berbey Alvarez</i>
14:20-14:40	39	Cucumber detection for precision agriculture applications <i>Roemi Fernández, Victor Aliende, Jelena Surdilovic, Dragoljub Surdilovic, Pablo Gonzalez-De-Santos and Manuel Armada</i>
14:40-15:00	27	Visual Control of a Robotic Arm <i>George Carter, Mohammad Tokhi and Ousmane Oumar</i>
15:00-15:20	36	A novel holonomic mobile robot manipulator robot for construction sites <i>Gurvinder Singh Virk, Artur Gmerek and Angelos Plastropoulis</i>
15:20-15:40	40	Inverse kinematic multiobjective optimization for a vehicle-arm robot system using evolutionary algorithms: a case and review <i>Humberto Rodriguez and Ilka Banfield</i>
15:40-16:00	41	Using collaborative robots as a tool for easier programming of industrial robots <i>Ioan-Matei Sarivan, Aleksandr Batuev, Andreea-Emilia Ciontos, Øjvind Holtskog, Emil Nordsted Sivertsen and Casper Schou</i>

Session 2.B-3: Designs for biomedical applications		
Session Chair: Héctor Montes		
Time: 14:00-15:20		Venue: Room 304
Time	Paper ID	Presentation
14:00-14:20	18	Proposal of a remote monitoring system of vital signs for heart failure patients <i>Hector Montes, Elia Cano, Carlos Rovetto, Juan Saldaña and Salvador Vargas</i>
14:20-14:40	48	Coloured petri net model for remote monitoring of cardiovascular dysfunction <i>Carlos Rovetto, Elia Cano, Karina Ojo, Modaldo Tuñon and Hector Montes</i>
14:40-15:00	49	Design of a gripping movement control system for a robotic hand prosthesis <i>Rutty Cedeño Arana, Lisbeth Mena López, Héctor Montes and Ricardo Cajo</i>
15:00-15:20	52	Robotics for facial reconstruction using medical images <i>Jose Serracin, Iveth Moreno, Rony Caballero and Hector Montes</i>

16:00-16:30	Coffee Break	Venue: Auditorium Hall
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16:30-16:50	Traditional Panamanian Folkloric Dance Presentation (Auditorium Hall)	
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CLAWAR Social Programme		
20:00-24:00	Conference Banquet Venue: Hotel El Panama – Portobelo Lounge	

Day 3
Wednesday 12 September 2018

08:00-09:00	Arrival and Registration (Auditorium Hall)
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CLAWAR Social Programme	
08:30-11:30	Visit to the Panama Canal Meeting point: Postgraduate Building - UTP Destination: Miraflores Locks, Panama Canal
08:30-10:30	Group 1
09:30-11:30	Group 2

09:30-10:30	Coffee Break	Venue: Auditorium Hall
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Laboratory and historical campus tour	
08:30-11:30	Visits to the laboratory of the UTP and brief tour around the UTP Campus with a historical interest Meeting point: Postgraduate Building - UTP
08:30-09:30	Group 2
10:30-11:30	Group 1

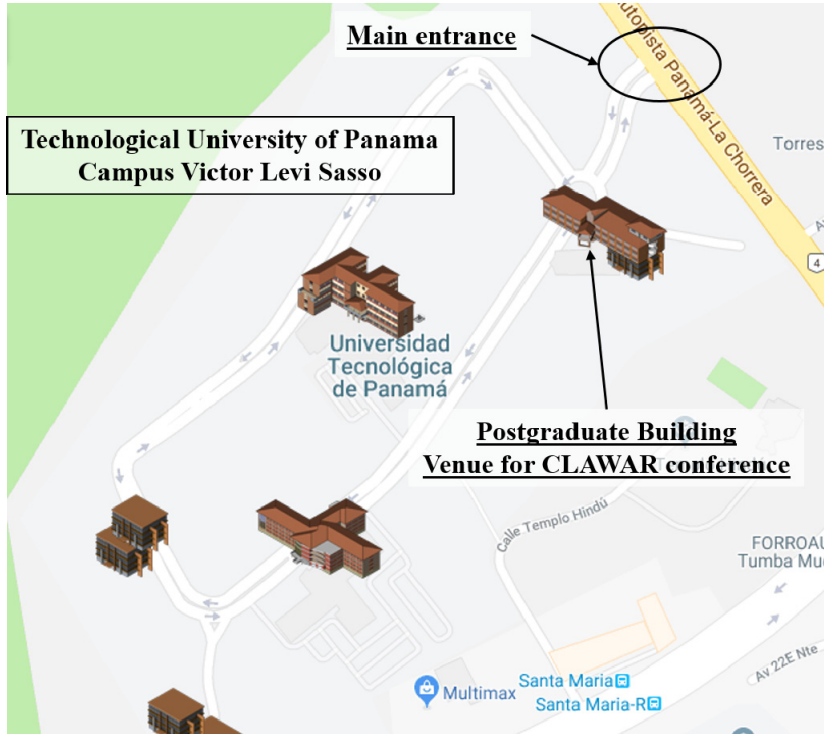
Note: It is estimated the transportation from the Conference Site toward the Panama Canal (and back) will be of 30 minutes, approximately. The estimated visit time will be 1 hour.

The logistics of this visit will depend of the number of interested and registered on Monday. Therefore, the laboratories tour will be adapted.

12:30-13:00	CLOSURE Venue: Auditorium
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13:00-14:30	Lunch	Venue: (Postgraduate Building Cafeteria)
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General map of the Technological University of Panama campus



The plenary sessions, the parallel sessions, the coffee breaks and lunches will be carried out at the Postgraduate building.

Localization of the Technological University of Panama (Conference Venue) and the Hotel El Panama (Transportation meeting point and conference banquet).

