

# BT Sym '21

Brazilian Technology Symposium

PERU

## Conference Program

January 12th, 13th, and 14th - 2022

Universidad Nacional del Altiplano – Puno, Perú

### Organization





# Welcome to the BTSym'2021 as a Virtual Event

The Brazilian Technology Symposium (BTSym), **ISSN 2447-8326**, is an event created by the Laboratory of Visual Communications of the Faculty of Electrical and Computer Engineering at the State University of Campinas. This is an excellent forum for presentations and discussions of the latest results of projects and development research in several areas of knowledge, in scientific and technological scope.

This event seeks to bring together researchers, students, and professionals from the industrial and academic sectors, seeking to create and/or strengthen the linkages between issues of joint interest. Participants are invited to submit research papers, case studies, articles of opinion, or posters, showing studies, methodologies, and results achieved in scientific level research projects, completion of course work for graduation, dissertations, and theses.

The BTSym'21 organizing committee invites researchers to attend and submit papers addressing the current research topics of interest. In 2022, the event will be held on **January 12th, 13th, and 14th at the Universidad Nacional del Altiplano – Puno, Perú**. Proceedings of the event will be published by **Springer** publisher through the book **Proceedings of the 7<sup>th</sup> Brazilian Technology Symposium - Emerging Trends and Challenges in Technology**, and will be submitted for indexing by **Scopus, WoS, and EI Compendex database**.

In 2021, we received **63 research works**.



Dr. Yuzo Iano  
*General Chairman*

# Organizing Committee



Rangel Arthur  
FT/UNICAMP

**Associate-General Chair BTSym**



Ariel Rogelio Velazco Cárdenas  
UNAP/PERU

**Associate-General Chair BTSym**



Ivan Delgado Huayta  
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Marco Antonio Quispe Barra  
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Maria Cecilia Luna  
LCV/DECOM/FEEC/UNICAMP

**Institutional Relationship Chair**



David Minango  
LCV/DECOM/FEEC/UNICAMP

**Institutional Relationship Chair**

# General information

## Conference location:

Virtual via Zoom

## Contact Info:

Phone LCV committee:

Alex Rodriguez:

+55 19 999984833 (Whatsapp)

## Useful Telephone Numbers:

Police: 105

Fire Brigade: 116

These numbers may be dialed from public or mobile phones, even without a card.

## Contact BTSym Support:

If you have any need for additional information, questions, concerns, and/or system issues, please feel free to contact the Editorial Office via email.

Email Address:

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## Virtual Oral and Poster Presentations:

The authors are obliged to be present during the panels designated for the presentation, using the time given by the person in charge of the panel discussion or poster session. Such presentations utilize technological solutions to allow you present live.

# Official Opening – Virtual Event

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<b>January 12th, 2022</b>	
<b>9:00 - 10:00</b>	<b>Official Opening</b> - Representante del BTSym21 - Brasil - Vicerrector de Investigacion - UNA - Puno - Perú
	<b>Opening Speaker</b> <b>Moderator:</b> Msc Alex Midwar Rodriguez Ruelas
	<b>Lecture – “Estrategias de accionamiento de alto desempeño para motores de inducción trifásicos: Control vectorial y control directo de par utilizando controladores de lógica difusa”</b>  <b>Speaker:</b> Dr. Jose Luís Azcue Puma

# Plenary Talks - PANEL 1

## January 12th, 2022 (10:30 – 12:00)

**Panel discussion 1:** Technology and industrial processes.

**Topic covered:** Industrial technological processes, Technology applied to production processes, Innovation models, Digital factory, Quality 4.0, Logistics 4.0, Innovation 4.0, Clean technologies, Industrial automation, Engineering Process Simulations.

**Moderators:**

- Dr. Carlos Raymundo Ibañez
- Ing. Hugo Raimundo Onque Llanque

10:30 - 10:40	<p><b>Paper: Active Power Filter Design Using Neural Network with a Variable Step-Size</b></p> <p>Authors: Alejandro Alvarez, Joseph Cherre, Christian Flores, and Julien Noel</p>
10:40 - 10:50	<p><b>Paper: ICT Infrastructure Usability Model in the Sustainability of Computational Equipment</b></p> <p>Authors: José Fortunato Zuloaga Cachay, Gilberto Carrión-Barco, Denny John Fuentes Adrianzén, Jessica Karin Solano Caverro, and Gisella Luisa Elena Maquen Niño</p>
10:50 - 11:00	<p><b>Paper: Design and Implementation of a X–Z Positioning Control System</b></p> <p>Authors: Pedro Garcia and Arturo Rojas Moreno</p>
11:00 - 11:10	<p><b>Paper: Control of MIMO Time-Delay Processes Having Disturbances with Time Delays</b></p> <p>Authors: Arturo Rojas Moreno</p>
11:10 - 10:20	<p><b>Paper: A Thermal Analysis of the Internal Flow in 2 Helical Coils for the Delignification Process of Sugar Cane Bagasse Using Superheated Steam</b></p> <p>Authors: Juan Carlos Loayza, and Julio Ronceros and Leonardo Vincés</p>
11:20 - 11:30	<p><b>Paper: Analysis of an Automated System in a Robotized Cell for the Transport, Control, Classification, and Organization of Heterogeneous Packages</b></p> <p>Authors: Daniel Alejandro, Jair Matos, Leonardo Vincés, and Hermann Mirko</p>
11:30 - 11:40	<p><b>Paper: An Algorithm to Obtain the Stained Area Ratio Based on Digital Image Processing Techniques for Organic Straw Classification</b></p> <p>Authors: Carlos Vargas, Bill Guillermo, and Leonardo Vincés</p>

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**Moderators:**

- Dr. Carlos Raymundo Ibañez
- Ing. Hugo Raimundo Onque Llanque

11:40 - 11:50	<p><b>Paper: A Computational Comparative Analysis Between Nvidia Jetson Nano and Raspberry Pi CM4 for the Classification of White Asparagus with SVM</b></p> <p>Authors: Edgar Ruiz, Manuel Ortiz, and LeonardoVinces</p>
11:50 - 12:00	<p><b>Paper: A Design of a Spindle and Mathematical Calculations of the Speed Required for HDPE Plastic Extrusion and Recycled PETG Plastic to Obtain 40 kg/h of Filaments 3 mm Thick</b></p> <p>Authors: Ana Fernanda Robledo, Patsy Gambini, Leonardo Vinces, and Mirko Klusmann</p>
12:00 – 12:10	<p><b>Paper: Comparative Study of PI and PID Controls with Kalman Filter Implemented for Water Level Control Based on Matlab and Factory I/O</b></p> <p>Authors: Alex Midwar Rodriguez Ruelas, Jeanette Quiñones Ccorimanya, Yuzo Iano , Marco Antonio Quispe Barra, Marco Antonio Ramos Gonzales and Midwar Elias Valencia Vilca</p>



# Plenary Talks - PANEL 2

## January 12th, 2022 (15:00 – 16:20)

**Panel discussion 2:** Microelectronics, Sensors, Robotics, Artificial Intelligence, and Real-Time Systems.

**Topic covered:** Microelectronics, MEMS, Reconfigurable Devices and Systems, Sensors, Robotics, Satellites, Aerospace and Defence, Artificial Intelligence, Radar System and Algorithms, Resilient and Robust Systems, Real-Time Systems.

**Moderators:**

- Dr. Guillermo Kemper
- Dr. Maximo Amancio Montalvo Atco

15:00 - 15:10	<p><b>Paper: Black-Shoes-Merton Model and Neural Networks in River Level Prediction: Case Study on La Leche River - Peru</b>            Authors: Diana Mercedes Castro Cardenas, Segundo Francisco Segura Altamirano, and Merly Liliana Yataco Bernaola</p>
15:10 - 15:20	<p><b>Paper: A Strategy of Potential Fields and Neural Networks in the Control of an Autonomous Vehicle within Dangerous Environments</b>            Authors: Luisa Chávez, Angel Cortez, and LeonardoVinces</p>
15:20 - 15:30	<p><b>Paper: Visual Angular Haze Detection Using Focus Metrics</b>            Authors: Esteban Centeno, Del Piero Flores, Diego Palma, Renzo Solórzano, and Victor Murray</p>
15:30 - 15:40	<p><b>Paper: Visual Angular Haze Detection Using SSIM</b>            Authors: Cesar Delgado, Oscar M. Castro, Alessandro Giuffra, and Victor Murray</p>
15:40 - 15:50	<p><b>Paper: Detection of Deforested Areas in the Peruvian Amazon Using Satellite Images</b>            Authors: Ricardo Carbajal, Alejandro Alvarez, Joshi Lopez, Miguel Saturno, and Victor Murray</p>
15:50 - 16:00	<p><b>Paper: Synthesis of Planar Linkages Using Optimization Methods</b>            Authors: Manuel Martínez, Sebastian Venero, Sergio Cancán, Gustavo Quino, and Elvis J. Alegria</p>
16:00 - 16:10	<p><b>Paper: A Blink Detection Algorithm Based on Image Processing and Convolutional Neural Networks</b>            Authors: Mariel Avalos, Salvatore Binasco, Guillermo Kemper, and Rodrigo Salazar-Gamarra</p>
16:10 - 16:20	<p><b>Paper: Three-axis Sensor Development for Ground Reaction Forces Measurement with Sports Applications</b>            Authors: Renzo Moscoso, Rocio Callupe, Jose Garcia, and Elizabeth R. Villota</p>

# Plenary Talks - PANEL 3

## January 13th, 2022 (9:00 – 10:00)

**Panel discussion 3:** Technology applied to buildings.

**Topic covered:** Construction 4.0, Automation and Robotics in buildings, Environmental comfort, Energy efficiency in buildings, Constructions, Technologies in Design, BIM, Construction Information Model, Provisional and adapted constructions, Sensors applied to civil construction, Sustainable buildings, Smart buildings.

**Moderators:**

- Msc. Juan Carlos Ajahuana Quispe
- Dr. John Carlos Quispe Chambi

9:00 - 9:10	<p><b>Paper: Simulation of Hail Damage in the Amylaceous Corn Production Acobamba, Huancavelica</b></p> <p>Authors: William Huamán-Tovar, Roberto Chuquilín Goicochea, Arcadio Sánchez-Onofre, and Ruggertths De La Cruz Marcos</p>
9:10 - 9:20	<p><b>Paper: Simulation of a System for Reducing Gases Emitted in a Steel Casting Process by Two-Stage Centrifugal Separation</b></p> <p>Authors: Alberto Mulatillo, Carla Sernaque, Julio Ronceros, and Leonardo Vinces</p>
9:20 - 9:30	<p><b>Paper: Large-Scale FDM 3D Printing in 6 Degrees of Freedom on One ARM KUKA KR 60</b></p> <p>Authors: Max Uriarte Chicoma, Diego Serrano Escobar, and LeonardoVinces</p>
9:30 – 9:40	<p><b>Paper: Changes in Sugars, Dry Matter, and Characteristics Sensory of Chip of Native Potato in the Chopcca Region</b></p> <p>Authors: Jovencio Ticsihua Huamán, Pedro Arteaga Llacza, Angélica Miranda Jara, Patricia Quispe Barrantes, Helí Miranda Chávez, Miguel Ángel Quispe Solano, and Roberto Chuquilín Goicochea</p>
9:40 - 9:50	<p><b>Paper: Identification of Soil Characteristics for the Extraction of Ch'ampa as Earth Block Masonry</b></p> <p>Authors: Yasmani Vitulas Quille</p>
9:50 – 10:00	<p><b>Paper: Decentralized Fuzzy Control for Minimum and Non-Minimum Phase of a Coupled Four-Tank System</b></p> <p>Authors: Jhon Bayona, Dante I. Narvaez, and Elvis J. Alegria</p>

# Plenary Talks - PANEL 4

## January 13th, 2022 (13:00 – 14:10)

**Panel discussion 4:** Product Development and Innovation.

**Topic covered:** Engineering design, Design methods, Design thinking, Sustainable product development, Circular economy, Cradle to Cradle (C2C), Innovation strategies applied to product development, Business model innovation, Digital innovation and transformation, Open innovation.

**Moderators:**

- Msc. Lucio Quispe Apaza
- Msc. Alex M. Rodriguez Ruelas

13:00 - 13:10	<p><b>Paper: Flipped Classroom to Improve the Learning of Mathematics in Students of the Public University of Lambayeque</b></p> <p>Authors: Diana Mercedes Castro Cardenas, Segundo Francisco Segura Altamirano, and Merly Liliana Yataco Bernaola</p>
13:10 - 13:20	<p><b>Paper: Design of a Hydrodynamic Profile for an Unmanned Underwater Device Using Numerical Simulation</b></p> <p>Authors: Axl Tocón, Cristian Vásquez, and Leonardo Vines</p>
13:20 - 13:30	<p><b>Paper: An Optimal Blade Design for Mini Wind Generators Mountable on the Spoiler of a Vehicle</b></p> <p>Authors: Daniel Gonzalez del Riego, Gabriel Gómez, and Leonardo Vines</p>
13:30 - 13:40	<p><b>Paper: Effect of Immersion Time in NaCl and Blanching Time on the Texture and Sensory Acceptability of Preserves Based on Ginger (<i>Zingiber officinale</i>) Surplusin Syrup</b></p> <p>Authors: Betty Yolanda Roque Velásquez, Verónica Náthaly Jacobo Domínguez, and Cesia Boñón</p>
13:40 - 13:50	<p><b>Paper: A Prototype Equipment for Revelation and Digitization of Periapical Radiographic Plates</b></p> <p>Authors: Andrés Figueroa, Leonardo Pereyra, Guillermo Kemper</p>
13:50 - 14:00	<p><b>Paper: Iconic-Verbal Strategies to Develop Reading Comprehension in Children of 4 Years Old</b></p> <p>Authors: Pascual Ayamamani, Liliana Valenzuela, Luisa Flores, and Diana Quispe</p>
14:00 - 14:10	<p><b>Paper: Manufacture of Sensitized Grätzel Solar Cells with NPs-TiO<sub>2</sub> and Natural Organic Dye Purple Corn (<i>Zea mays</i> L.) as Potential Use in the Photovoltaic Industry</b></p> <p>Authors: Ruth Yanina Condori Queque, Maria Esther Quintana Cáceda, Ana Beatriz Alvarez, and Gabino Rey Vidangos Ponce</p>

# Plenary Talks - PANEL 5

## January 13th, 2022 (15:00 – 16:00)

**Panel discussion 5:** Telecommunications, product development and innovation in mobile systems.

**Topic covered:** New products and services, Mobile systems for 4G and 5G cell phones, Visual computing, Image and video processing, Machine learning, Human-computer interaction using image processing, Image processing for real-time control, Medical image processing, new generation of digital TV, Digital TV interactivity, Broadband and transmission systems.

**Moderators:**

- Dr. Jose Alberto Torrico Altuna
- Msc. Alex Midwar Rodriguez Ruelas

15:00 - 15:10	<b>Paper: Aztec Curve: Proposal for a New Space-Filling Curve</b> Authors: Diego Ayala, Daniel Durini, and Jose Rangel Magdaleno
15:10 - 15:20	<b>Paper: Characterization of the Electromagnetic Propagation in Inca Walls of the Archaeological Site of Rumiwasi using ARMA processes in the band from 800 MHz to 1 GHz</b> Authors: Henry L. Davila Andrade and Jorge L. Arizaca-Cusicuna
15:20 - 15:30	<b>Paper: A Humidity and Temperature Wireless Monitoring System for Server Rooms Based on the MQTT Protocol</b> Authors: David Vilcherrez , Christian Astulla , and Guillermo Kemper
15:30 - 15:40	<b>Paper: MPPT Perturb - Observe Algorithm with Fuzzy Logic for a Dual Active Bridge-Series Resonant Converter</b> Authors: James Rolando Arredondo Mamani, Mario Gaston Borja Borja, Marco Antonio Quispe Barra, Jorge Apaza Cruz, Gabino Vidangos Ponce, Russel Lozada Vilca, and Oliver Amadeo Vilca-Huayta
15:40 - 15:50	<b>Paper: Total Phenolic Content and Antioxidant Activity of a Macha Macha Beverage (Vaccinium floribundum Kunth)</b> Authors: Domingo Utus Ramires, Pedro Arteaga Llacza, Ruggierths De La Cruz Marcos, Angélica Miranda Jara, Helí Miranda Chávez, Miguel Ángel Quispe Solano and Roberto Chuquilín Goicochea
15:50 - 16:00	<b>Paper: Evaluation of the Yield, Sensory Characteristics, and Digestibility of Expanded Quinoa</b> Authors: Noemi Quispe Boza, Pedro Arteaga Llacza, Ruggierths De La Cruz Marcos, Angélica Miranda Jara, Helí Miranda Chávez, Miguel Ángel Quispe Solano, and Roberto Chuquilín Goicochea

# Plenary Talks - PANEL 6

## January 14th, 2022 (9:00 – 10:10)

**Panel discussion 6:** Technologies applied to urban infrastructure.

**Topic covered:** Smart Cities, Urban environmental comfort, Technologies applied to urban planning, Technology and management of urban infrastructure, Innovation and technology in the urban environment, Intelligent technology and transport, Urban monitoring.

**Moderators:**

- Dr. Ivan Delgado Huayta
- Ing. André Torres Quispe

9:00 - 9:10	<p><b>Paper: Transformative School Digital Sustainability Model to Improve Teacher Professionalism and Identity in Primary Education</b>            Authors: Lucia Isabel Chamán Cabrera, Silvia Juana Saavedra Díaz, Luis Alberto Chunga Pajares, and Consuelo Ivonne Del Castillo Castro</p>
9:10 - 9:20	<p><b>Paper: Emerging Digital Transformation Model for Teaching Strategies to the Achievement of Meaningful Learning in Education 4.0</b>            Authors: Consuelo Ivonne Del Castillo Castro, Luis Alberto Chunga Pajares, Lucia Isabel Chamán Cabrera, and Silvia Juana Saavedra Díaz</p>
9:20 - 9:30	<p><b>Paper: Design of a Pisco Sour Vending Machine Based on an Embedded System (Raspberry Pi)</b>            Authors: Jesús Achuy, Renzo Arestegui, and Leonardo Vincés</p>
9:30 – 9:40	<p><b>Paper: Perceived Effectiveness of Gender-Based Virtual Education in Times of COVID-19 Pandemic in University Higher Education</b>            Authors: Carlos Valdivia , Roger Alarcón, Jessie Bravo, Janet Aquino, Nilton Germán, and Fiorella Li</p>
9:40 - 9:50	<p><b>Paper: Prototype of a Data Logger for Monitoring Carbon Dioxide and Particulate Matter Concentrations in Juliaca</b>            Authors: Russel A. Lozada Vilca, Jeanette Quiñones Ccorimanya and Ivan Delgado Huayta</p>
9:50 - 10:00	<p><b>Paper: Proposed Improvement of the Mining Cycle to Increase Productivity in a Mining Company in La Libertad Region, 2020</b>            Authors: Robert Christian Castro Riquez and Miguel Enrique Alcalá Adrianzén</p>
10:00 - 10:10	<p><b>Paper: Improved IMC for Pressure Control of Oil Wells During Drilling Modeled with an Integrative Term Under Time-Delay</b>            Authors: Carlos Alexis Alvarado Silva, Geraldo César Rosário de Oliveira, Víctor Orlando Gamarra Rosado, and Fernando de Azevedo Silva</p>

# Plenary Talks - PANEL 7

## January 14th, 2021 (13:00 – 14:40)

**Panel discussion 7:** Applied Biomedicines.

**Topic covered:** Medicine, Covid-19, Dentistry, Biology, Biomedicine, Nursing, Medicines, Vaccines.

**Moderators:**

- Dr. Elmer Lévano Huamaccto
- Msc. Milton Vladimir Mamani Calisaya

13:00 - 13:10	<p><b>Paper: Cross Mutual Information Analysis of EEG Signals for Cognitive Task Discrimination</b></p> <p>Authors: Joaquin Peralta and Christian Flores</p>
13:10 - 13:20	<p><b>Paper: Study of Depression, Academic Stress and Demographic Variables in the Academic Performance of Students of a Public University Using Multivariate Methods, Lima - Peru</b></p> <p>Authors: Félix Bartolo Gotarate and Olga Solano Dávila</p>
13:20 - 13:30	<p><b>Paper: Study of Malnutrition in Children Under Five in Peru Using the Exploratory Spatial Data Analysis</b></p> <p>Authors: Bryan Martin González Cusi and Olga Lidia Solano Dávila</p>
13:30 – 13:40	<p><b>Paper: Evaluation of Adjustment Models for Taking Body Temperature with a Thermal Imaging Camera in the Context of COVID-19</b></p> <p>Authors: Gabriel Cruz, Raul Mamani, Henry Torres, Victor Salcedo, Cristian Benites, Reencarnacion Quispe, Franklin Cardeñoso, and Jorge L. Arizaca-Cusicuna</p>
13:40 – 13:50	<p><b>Paper: Micropropagation of Myrcianthes ferreyrae (McVaugh) “Arrayán”: An Endemic Species from Lomas de Atiquipa</b></p> <p>Authors: Ana Caldas Araujo, Fiorella Medina Medina, Patricia Viveros Flores and Herbert Lazo Rodriguez</p>
13:50 – 14:00	<p><b>Paper: Technological Resources for Teaching/Learning in Biomedical Areas in the COVID-19 Pandemic Context: Systematic Review</b></p> <p>Authors: Tania Carola Padilla Cáceres, Luz Marina Caballero Apaza, Vilma Mamani Cori, and Sheyla Lenna Cervantes Alagón</p>
14:00 – 14:10	<p><b>Paper: Motivation and Job Performance at the Regional Health Management of La Libertad during COVID-19</b></p> <p>Authors: Marco A. Quispe Barra, Miryam Lora Loza, Yris Cedrón León, Juan Rodríguez Vega, Fanny Sofia Quispe Barra and Vanesa Castillo Castro</p>

# Plenary Talks - PANEL 7

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**Topic covered:** Medicine, Covid-19, Dentistry, Biology, Biomedicine, Nursing, Medicines, Vaccines.

**Moderators:**

14:10 - 14:20	<p><b>Paper: Quality and User Satisfaction of the Telemedicine Service in Cardiology During COVID-19</b></p> <p>Authors: Miryam Lora Loza, Marco Quispe Barra, Castro Uceda Maria, Juan Rodríguez Vega, David Salinas Mendoza, and Jenner Fabián-Ramírez</p>
14:20 - 14:30	<p><b>Paper: Clinical Management for Hospitalization of Patients with COVID-19 and Resolution Capacity Functionality in I-4 Facilities. Contumazá-Cajamarca Health Network, 2021</b></p> <p>Authors: Juan Rodríguez Vega, Miryam Lora Loza, Marco A. Quispe Barra, Segundo Manuel Hoyos Gallardo, André Torres Quispe, and Jhon Rengifo Castillo</p>
14:30 - 14:40	<p><b>Paper: Job Motivation and Mental Health Status of Care Personnel at the District Hospital-La Esperanza During COVID-19</b></p> <p>Authors: Miryam Lora Loza, Marco Quispe Barra, Julia Alvarado Alfaro, Juan Rodríguez Vega, Davis Alberto Mejía Pinedo, Rosa Estrella Pillman Infanson, and Maximo Amancio Moltalvo Atco</p>

# Official Closing – Event Virtual

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**January 14th, 2022**

**Official Closing**

**Moderator:** Msc Alex Midwar Rodriguez ruelas

**15:00 - 16:00**