CREDITS

This journal – the first of its kind in Costa Rica - showcases the work of students and faculty carried out as part of the focal point for scholarly basic and applied research on materials in the medical device field. Works carried out outside of the program on related topics are also welcome to submit a contribution.

Journal of ENGINEERING in Medical Devices

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DESIGN AND PRINT

Unidad de Publicaciones TEC

Main cover caption: Process followed for the design of a cleft lip and cleft palate device: using different 3D technologies to capture the face of an infant, a model with the features of the face can be constructed, from which a customized device can be designed and then prototyped. Images courtesy of Gustavo Rojas-Soto, David De Faria-Castro, Miceldy Rios-Sanabria, Victor Carmona-Infante, from the contribution: **MEDICAL DEVICE FOR TREATMENT OF CLEFT LIP AND CLEFT PALATE AFTER SURGICAL PROCEDURE** included in this issue.

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Contents

Academic tools for the challenges of the future

Costa Rica has gained, with the passing of the years, a recognized name around the world as a strategic destination for investments with high added value in one of the most dynamic sectors, as is the Life Sciences. This is without a doubt one of the fastest growing sectors promoted by CINDE for the attraction of foreign direct investment of multinational companies.

Today, six out of the ten most important companies in the world in the cardiovascular sector are operating from Costa Rica, which are also part of 70 multinational companies in the medical devices sector that reported exports in 2016 of the sum of US $2,500 million and generated employment to more than 21,000 Costa Ricans.

In this context, the Master's Degree in Medical Device Engineering, a driven initiative from the Instituto Tecnológico de Costa Rica (TEC), the University of Minnesota and CINDE, is vital to meet the demand of professionals that these companies are requiring, and to expose our human resources to the new educational trends that set the standard around the world.

The challenge for the future of Costa Rica is to achieve that the academic sector responds to global transformation, as TEC has been doing. The Master Program in Medical Device Engineering is a first initiative, and gradually more academic initiatives will have the challenge of complying with standards and specialization required with an industry in constant transformation.

Vanessa Gibson, Manager of Investment Climate

Costa Rican Investment Promotion Agency (CINDE).

Journal of ENGINEERING in Medical Devices

In this second issue of the Journal of Engineering in Medical Devices, new contributions from work carried out during the Graduate Program in Medical Devices Engineering of the Costa Rica Institute of Technology are presented with great satisfaction from the Editorial Committee. For example, the Materials Characterization class, which provided original papers for the **Academic Focus** section, shows incredible progress has been achieved in acquiring new equipment and in know-how for failure analysis of materials, determination of structure and chemical composition, and structure – property relationships. Different kinds of materials such as polymers (Nylon and EVA) and metals (Titanium and Stainless Steel) were characterized to address quality issues or gain knowledge about the material.

In the **Applied Engineering** section, two completely innovative designs for medical devices, conceptualized from the graduation work of students, are presented. It is important to highlight the focus on prototyping and testing of these devices on real situations with the recommendation from physicians. The use of additive manufacturing techniques has a lot of value added to the design work.

In the **Technical Notes** section, an interesting work on simulation of severe plastic deformation techniques for processing of biomedical titanium alloys is shown, with great potential for development of interesting processes for manufacturing of medical device components. Simulation is a hot field in research and development groups of the medical device companies.

Finally, I would like to remind the readership of this journal that contributions from industry and academia that fit the scope of the journal are welcome to submit a paper.

Also, we once more acknowledge all the contributors, supervisors and reviewers for their hard work in providing the content of this issue. We expect to match the expectation of our readership and improve the quality of the contributions with time.

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