

1st Workshop on Engineering in Medical Applications Program			
Time	Name	Presenter	Institution
7:45	OPENING		
8:00	Serious Gaming and Gamification, for Medical-Based Education and Training: Overview, Existing Work, and Open Problems	Bill Kapralos	University of Ontario
8:15			
8:30	Light-assisted Direct Writing, Visualizing, Analyzing System for Micro Pattern using Biomaterials	Li Hao	Chonnam National University Buk-gu, Gwangju, Korea
8:45	Fundamentals of Micro-robots Technology	Hernando Leon-Rodríguez	Chonnam National University, Korea - Universidad Militar Nueva Granada
9:00	Bridging the mismatch existent between engineers (developers) and healthcare professionals (users)	David Rojas	University of Toronto
9:15			
9:30	Mobile Robots for Assistive Applications	Silas Alves	University of Sao Paulo
9:45			
10:00	BREAK		
10:15	Análisis de material bioabsorbible para reparación de fracturas en mano	Oscar Fernando Avilés Sanchez, Mauricio Maledoux Monroy, Ricardo Castillo Estepa, Oscar Gerardo Rubiano, Andrés Durán	Universidad Militar Nueva Granada
10:30	Relevance of cushion and rigidity of footwear used in combination with ankle-foot orthoses on the gait of children with cerebral palsy	Alejandra Castelblanco, Jaebum Son PhD, Juan C. Briceño PhD, José Duplat MD, Fernando Ortiz MD, Luis Rueda MD.	Universidad de los Andes - Instituto de Ortopedia Infantil Roosevelt
10:45	App para respuesta en paciente con status convulsivo	Engie Ruge	Universidad Militar Nueva Granada
11:00	Guía Interactiva para el uso del Desfibrilador Externo Automático	Mario Andrés Vargas, Alvaro Joffre Uribe	Universidad Militar Nueva Granada
11:15	La realidad aumentada aplicada en el aprendizaje de la anatomía del ojo	Carlos Soto, Mario Vargas, Alvaro Uribe, Bill Kapralos	Universidad Militar Nueva Granada
11:30	Simulador Neuroquirúrgico Daubara NS Trainer	Juan Diego Lemos, Alher Mauricio Hernández, Jhon Jairo Velásquez	Universidad de Antioquia
11:45	Design of a new low-cost mechanism to drive active forearm prosthesis	Juan Sebastián Cuellar, Jaebum Son PhD.	Universidad de los Andes
12:00	Normalización de protocolo de diseño de un prototipo de marcapasos para estimulación cerebral profunda, aplicado a la enfermedad de Parkinson	Antonio Pulido, Bettina Stein	Universidad del Rosario - Escuela Colombiana de Ingeniería Julio Garavito
12:15	3d reconstruction of bones for typical development and cerebral palsy children's lower extremities from biplanar radiographs	Cindy Cárdenas, Jaebum Son PhD, Juan C. Briceño PhD	Universidad de los Andes
12:30	LUNCH TIME		
12:45			
13:00			
13:15			
13:30	Centro de Telesalud sobre una arquitectura orientada al servicio	Ing. Jenny Ubaque, Ing. Leonardo Ramírez, Ing. Edward Guillen	Universidad Militar Nueva Granada
13:45	Aplicaciones móviles para el autocuidado de la salud	Ing. Jeisson Sanchez, Ing. Jenny Ubaque, Ing. Leonardo Ramírez, Ing. Edward Guillen	Universidad Militar Nueva Granada
14:00	The role of converging technologies Nano, Bio, Info, Cogno in the development of biomedical applications	Oscar Herrera	Universidad Central
14:15			
14:30	Diseño y simulación de dispositivo de microfluídica por ruptura de membrana para la detección de VIH (AIDS)	Lagos, S., José, A. Leguizamón, F., Ana, M. Quiroga, T., Daniel, A.	Universidad Militar Nueva Granada - Universidad Manuela Beltrán
14:45	Sistema de realidad aumentada para la interacción con el instrumental del acceso venoso central	Erika Gutiérrez Puerto	Universidad Militar Nueva Granada
15:00	Sistema de seguimiento de posición y orientación de un maniquí para Acceso Venoso Central en neonatos	Ingrith Ochoa Casas	Universidad Militar Nueva Granada
15:15	Diseño y construcción de un medidor de la impedancia bioeléctrica para determinar composición corporal y cambios celulares	Bonilla Bohórquez Laura, De la Hoz Romo María Clara, Rojas Torres Nataly, Romero Ramírez Héctor, Meneses Bernal Jorge Eduardo	Universidad El Bosque
15:30	Análisis de un mecanismo para la rehabilitación del tobillo en niños con parálisis cerebral espástica.	Karin Stefanny Muñoz Castillo, Crhistian Camilo Segura Gomez, Oscar Aviles Sanchez, Mauricio Maledoux Monroy	Universidad Militar Nueva Granada
15:45	BREAK		
16:00	Diseño e implementación de tensiómetro con simulación para el diagnóstico de fallas	Mynam Andrea Daza Guerrero	Corporación Universitaria de Ciencia y Desarrollo - Uniciencia
16:15	Desarrollo de un prototipo de sistema de captura de movimiento para actividad física del miembro inferior como interfaz de usuario en un ambiente de realidad virtual	Jennifer Estefanía Ramos Montilla, Alvaro Joffre Uribe	Universidad Militar Nueva Granada
16:30	Ankle bending stiffness of ankle-foot orthosis: a critical characteristic for AFO prescription in children with cerebral palsy	Juliana Sánchez P, Jaebum Son, Juan Carlos Briceño, Jose Luis Duplat, Fernando Ortiz; Luis Eduardo Rueda.	Universidad de los Andes - Instituto de Ortopedia Infantil Roosevelt
16:45	Aplicación de realidad virtual para el diagnostico de patologías en la mano	Carlos Zubieta, Oscar Avilés, Ricardo Galán, Mauricio Maledoux	Universidad Militar Nueva Granada
17:00	Diseño e implementación de un dispositivo portable, con asistencia GPS, para orientar a personas con discapacidad visual en el sistema de transporte masivo de Bogotá (Transmilenio).	Fabian Steven Garay Rairan, Nubia Rincón Mosquera, Luis Andrés González Castro, Diego Alejandro Segura Garzón	Universidad Distrital Francisco José de Caldas
17:15	Desarrollo de una Aplicación Móvil en Realidad Aumentada para Mejorar el Campo de la Comunicación de Niños Autistas en la Clínica Neurorehabilitar.	Fabian Steven Garay Rairan, Nubia Rincón Mosquera, Wilson Rodríguez Arias, Wilmer Pérez Betancourt	Universidad Distrital Francisco José de Caldas
17:30	CLOSURE		

Invited Speakers

Bill Kapralos



Bill Kapralos is an Associate Professor in the Game Development and Entrepreneurship (GDE) program at the University of Ontario Institute of Technology, an Adjunct Professor at York University (Department of Computer Science and Engineering), and an Honorable Guest Professor at Shizuoka University (Graduate School of Informatics) in Japan.

Serious Gaming and Gamification, for Medical-Based Education and Training: Overview, Existing Work, and Open Problems

The rising popularity of video games has seen a recent push towards the application of serious games, that is, video game-based technologies to teaching and learning, in medical education and training. One of the prevailing arguments for using serious games in the learning process of medical trainees is their ability to engage them in the active accumulation of cognitive (and to some degree technical) skills outside of the medical theater. This provides trainees the opportunity to reach a specific competency level in an interactive, engaging, ethically safe, and cost-effective manner before exposure to live patients. Despite the current “buzz” surrounding serious games, there are various problems that must be addressed before their use becomes more widespread. Many of these problems relate to how levels of realism and multi-modal cue interaction can affect immersion, and learning. Questions related to “how much realism is needed to maximize learning?” and “what effect do multi-modal cues have on learning?” amongst others, may have a number of implications, particularly when considering that perfect realism appears to be impossible to achieve (at least with our current technology). Furthermore, striving to reach a high degree of realism can lead to increased development costs and increase the probability of lag and subsequent discomfort and simulator sickness. In this presentation, serious games will be introduced followed by a discussion of the application of serious games for medical education and training. An overview of my own research work that focuses on serious gaming for medical education, real-time spatial sound generation for interactive virtual environments, and how these two areas are being merged will be also be provided. The presentation will end with a discussion regarding a number of issues, and open problems, with an emphasis on those related to fidelity, realism, multi-modal interactions, and the resulting implications on learning and computational requirements.

David Rojas



David Rojas BEng MSc is a PhD candidate at the Institute of Medical Science, University of Toronto. He is also a fellow at the Wilson Centre (Toronto General Hospital) and Learning Institute (Sickkids Hospital). David is an engineer and a computer scientist, whose research seeks to bring concepts from these two disciplines into the health profession education field. He is interested in the concept of technology-enhanced learning, and he is developing a model for the proper development and implementation of technology in health professions education. His research uses engineering theories/principles and applies them to the development and implementation of technologies such as simulators and online learning environments within educational contexts. David explores how systems engineering approaches could be useful to technology developed for education. Some of his research has also focused on the use of games elements (Gamification) to increase students' motivation; and human multi-modal interactions for visual quality perception on virtual reality simulators.

Bridging the mismatch existent between engineers (developers) and healthcare professionals (users)

If we think about why we use technology nowadays, the answer seems to be straight forward; it helps to make our life easier. This premise aligns with the primary goal of technology development which is to help overcome the physical and cognitive human limitations with the use/development of artifacts. During the last two decades we have seen the rapid evolution of technology, leading to the development of simulators, e-learning environments, and information management systems, which have been included within the health professions education (HPE) field. However, despite the expected benefit of using technology in education, literature in HPE shows that the effectiveness of this implementation is highly inconsistent, being only modest at best, in the cases where it is effective. This inconsistency makes us question, what is really happening? I call this phenomenon the educational mismatch. If technology is developed to overcome physical and cognitive human limitations, it is expected that it will enhance the context in which it is introduced when applied. Technology in health professions education has been only analyzed as an isolated tool, trying to figure out “how to use it?”, “how much fidelity do we need?”, “what are the best practices for the implementation?”; and little has been investigated regarding the real need for it, and the impact that it has on the user, the environment, and vice versa.

In this presentation, I will provide a brief introduction of the role that technology plays in health professions education. I will also cover the role of engineers within the field, and I will explain part of my program of research to elucidate the educational mismatch. I will also provide examples of my experience as an engineer in the HPE field, and I'll end with some insights of problems that we are currently facing regarding the use of technology in HPE. The conversation will focus around simulators and e-learning environments.

Oscar Leonardo Herrera-Sandoval



Oscar Herrera is Associate Professor in the Electronic Engineering Department of Universidad Central at Bogotá, Colombia, and founding member and president of the Colombian chapter of IEEE Engineering in Medicine and Biology. B.S. in Physics from the National University of Colombia, Electronic Engineer from the University Antonio Nariño, Master in Electronic Engineering with emphasis in Bioengineering from the University of the Andes, Doctor in Nanotechnology of the University of Genoa in Italy and the Technical University of Darmstadt in Germany and Post doctorate from the Technical University of Darmstadt in Germany.

The role of converging technologies Nano, Bio, Info, Cogno in the development of biomedical applications