Welcome to Honolulu, Hawaii
and the
40th Annual Conference
of the
IEEE EMBS
July 17 to 21, 2018
Discovering, Innovating and Engineering
the Future of Biomedicine

Nigel Lovell, President, EMBS
EMBS - World’s Oldest and Largest
Biomedical Engineering Organization

Since 1952
11,000 Members
1900 Student Members
Over 200 Chapters & Clubs (Student & Society) Worldwide

Advancing Healthcare Through Technology

http://www.embs.org
Early Career Achievement Award

Carmen Poon
Chinese University of Hong Kong, China

“For contributions to wearable sensing and endoscopic surgery”

Nominated by: Guang-Zhong Yang
Academic Career Achievement Award

Neville Hogan
Massachusetts Institute of Technology, USA

“For exceptional contributions of leadership, education and mentorship in the field of biological robotics, neural control of movement, and human-machine interface.”

Nominated by: James Patton on behalf of the Technical Committee on BioRobots
Professional Career Achievement Award

Howard Levin
Coridea, LLC

“For outstanding scientific, medical and technical contributions to the development of novel medical technologies and devices for the treatment hypertension and heart failure.”

Nominated by: Dorin Panescu
Technical Achievement Award

Elliot McVeigh
University of California, San Diego

“For recognition of his outstanding and pioneering contributions to the advance of the magnetic resonance field in cardiac studies, with many seminal works now translated in the clinical practice.”

Nominated by: Enrico Grisan
Technical Achievement Award

Ellis Meng
University of Southern California

“For outstanding contributions to biomedical microelectromechanical systems and their applications in drug delivery, microsensors, and neural interfaces”

Nominated by: Michael Khoo
IEEE EMBS Turkey Chapter has been very active in 2017-2018 term. The annual conferences technically co-sponsored by our chapter were very beneficial to our members by means of their rich scientific and social programs. Medical Technologies Congress, TIPTEKNO-2017 was held in Trabzon, Turkey during Oct. 12-14, 2017.

The Scientific Meeting on Electrical-Electronics & Biomedical Engineering and Computer Science (EBBT’2017) took place in April 20-21 2017 at Tepekent Campus in Istanbul Arel University.

In addition to these conferences where latest information is exchanged among researchers on technical advances in Biomedical Engineering area, a variety of student activities has been organized. EMBS Turkey student conference held in Yeditepe University Conference Hall on May 2017 and was a big hit with more than 900 participants and a great program.

IEEE EMBS ISC’18 EUROPE is organized by Izmir Katip Celebi University IEEE Student Chapter in Izmir, Turkey on May 5-6, 2018.

After being selected as the Outstanding Performance Award EMBS Chapter for 2018, EMBS Turkey Chapter will continue the hard work with the upcoming technical and social events for its members and students to promote the IEEE EMBS and Biomedical Engineering field in general.
2018 EMBS Chapter Awards

Outstanding Performance Award EMBS Student Chapter/Club
EMBS Student Chapter CICB Concepción

The Carleton “The IEEE EMBS Biomedical Engineering Student Chapter of the University of Concepción, Chile (or “Capítulo de Ingeniería Civil Biomédica CICB Concepción”) is an organization created by students on June 2011. It started as a Student Club, and became a Student Chapter in 2016. Our organization is formed by undergraduate and graduate students from different disciplines such as Biomedical, Electrical and Bioengineering.

Our goal is to promote the development of Biomedical Engineering in the region and the country, bringing science and technology closer to the community to contribute to the comprehensive formation of the students of Biomedical Engineering and related areas.

Within our activities, we have talks and workshops in various areas such as "Design and 3D printing", "PCB Design", "Development of Mobile Applications", "Introduction to Programming" and "IoT". We sponsor the "Programando Futuro" initiative that brings programming and electronics closer to primary school children. We are the organizers of the "Women in Engineering Seminar", which promotes the visibility of women in various engineering specialties. Also, we actively participate in the organization of the Annual Biomedical Engineering Congress (CABI) that manages to bring together students and professionals from all over the country to talk about the advances developed in the area of engineering for medicine and health.

In 2012, our group was recognized by the EMBS for "Best New Club / Student Chapter" in San Diego, United States. In 2013, we received the "Outstanding Performance Award for Student Branch Club". Finally, this year we have the honor of being recognized by the "Outstanding Performance Award EMBS Student Chapter or Club for 2018". This recognition of our effort and volunteer work not only fills us with joy but motivates us to continue advancing and striving every day to inspire new students and future professionals in the field of biomedical engineering to meet their goals, contributing with technology and science to the medical field and the society."
2018 EMBS Chapter Awards
EMBS Best New Student Chapter Chapter/Club
EMBS UIC Student Branch-University of Illinois at Chicago, EMB18

The The IEEE Engineering in Medicine and Biology Chapter at University of Illinois at Chicago (UIC) was established in February 2017. Our young chapter is devoted to enhancing the professional development of all engineers in the context of engineering applied to medicine and biology. Our mission is to expose students to engineering principles outside of the curriculum, allowing the students to advance their engineering skill set and apply their knowledge to real-world problems.

In the first year of our establishment, we have hosted multiple events, including the Distinguished Lecturer where Dr. Michael Friebe, Otto von Guericke University, spoke about medical device design and how to prevent poor devices from reaching the market. Sixty attendees from various engineering departments were present at the talk. The chapter also directed and sponsored two ongoing projects, the first project focuses on constructing a humanoid robot, and the second project’s goal is to develop a prosthetic arm that can be controlled using a brain-computer interface. We also attended the IEEE Region 4 Student Conference at Northern Illinois University.
Mark S. Humayun

*For contributions to the bioelectric retinal implant*

A pioneer in vision restoration, Mark S. Humayun's development of the Argus II bioelectric artificial retina is improving patient quality of life by restoring sight to the blind. The first and to date only artificial retina to be both approved by the U.S. FDA and receive the European CE mark, the device receives image data from an external camera that is wirelessly transmitted to an electronic array implanted on the retina, enabling patients who are blind to recover enough vision to see letters and large objects and navigate obstacles. Key to the realization of the implant was Humayun's ability to lead diverse teams of engineers and combine the unique elements of electrical/biomechanical engineering, optics, materials science, and miniaturization. Humayun's current focus with the implant is on providing color vision and the ability to read smaller text.

An IEEE Fellow, Humayun is a professor at the University of Southern California, Los Angeles, CA, USA.

*Sponsored by the IEEE Circuits and Systems Society and IEEE Engineering in Medicine and Biology Society*
IEEE Medal for Innovations in Healthcare Technology

Thomas F. Budinger

Thomas F. Budinger’s groundbreaking work has defined how radiation can be safely applied to medical imaging, enabling the development of positron emission tomography (PET) and single photon emission computed tomography (SPECT) radiotracers critical to investigating conditions including cancer, heart disease, Alzheimer’s disease, and brain injury. His research group at the Lawrence Berkeley National Laboratory has made world-class contributions in the fields of radiotracer development, radiotracer imaging, and tomographic image reconstruction. Budinger pioneered the use of the 82-Rb generator for heart imaging, which was commercialized under the brand name CardioGen-82, for clinical use. He performed the first SPECT dynamic imaging study of the human heart, which required a novel combination of list-mode data acquisition, cardiac gating, attenuation measurements of the spatially inhomogeneous human chest, and tomographic reconstruction. Budinger’s team created the Primer on Reconstruction Algorithms, which was distributed worldwide during the late 1970s and 1980s, allowing scientists and students to gain hands-on experience in computed tomography using radionuclides or X-rays. This work also led to the quantitative understanding of how time-of-flight could be used in PET and how the statistical noise in reconstructed PET images could be reduced as the timing resolution was improved. These concepts are found in PET scanners being used today. Under his leadership, the construction of the PET 280 and the PET 600 scanners demonstrated how the limits of PET resolution could be approached. The PET 600 was constructed using 600 individually paired detectors and photomultiplier tubes to obtain a landmark 2.3-mm resolution. Budinger was a key player in the development of the Committee on Medical Internal Radiation Dose (MIRD) guidelines for safe use of radiopharmaceuticals. The MIRD Primer was published in 1988, providing outlined models and methods for determining organ dosimetry. He described, from biophysical principles and experiments, the safety of magnetic resonance imaging that is leading to human studies at 10 Tesla and beyond.

An IEEE Life Member and member of both the U.S. National Academy of Medicine and National Academy of Engineering, Budinger is a professor of bioengineering at the University of California, Berkeley, Berkeley, CA, USA.
Pamela Ann Abshire
for contributions to CMOS biosensors

Gary Christensen
for contributions to medical image registration
and analysis

Dario Farina
for contributions to neuromuscular
electrophysiology and neurorehabilitation

Thomas Furness
for leadership in virtual and augmented reality

Cuntai Guan
for contributions to brain-computer interfaces
and applications

Kullervo Hynynen
for contributions to image-guided therapeutic
focused ultrasound

Leon Iasemidis
for developments in epileptic seizure prediction
and closed-loop brain stimulation

Lynette Jones
for contributions to tactile and thermal displays

Sung Kim
for contributions to the design of microfabricated
neural prosthetic devices

Pablo Laguna Larosa
for contributions to cardiac biomedical signal
processing

Zhenqiang Ma
for contributions to flexible and biodegradable
microwave electronics

Paul Meaney
for contributions to microwave tomography and
its translation to clinical use

Konstantina Nikita
for contributions to bioelectromagnetics and
implantable antennas for medical applications

Barbara Oakley
for outreach through online engineering
pedagogy

Constantinos Pattichis
for contributions to medical diagnostic and
mobile health systems

Josien Pluim
for contributions to medical image analysis

Badrinath Roysam
for contributions to image processing algorithms
for biological microscopy

Dinggang Shen
for contributions to medical image analysis

Jocelyne Troccaz
for contributions to robotics and imaging for
medical applications

Stephen T Wong
for leadership in drug discovery, systems biology,
bioinformatics, and health analytics

Habib Zaidi
for contributions to quantitative multimodality
molecular imaging
### EMBS Past Award Recipients

#### Professional Career Achievement Awards
- 2018: Howard Levin
- 2017: Karl E. Friedl
- 2015: Matthew O’Donnell
- 2011: Yongmin Kim
- 2009: Luke Lee
- 1979: Robert Plonsey
- 1974: Dean L. Franklin
- 1973: Donald F. Childers
- 1968: Wilson Greatbatch
- 1967: Herman Schwan
- 1963: Otto Schmitt
- 1961: Britton Chance
- 1956: Edward F. MacNichol

#### Academic Career Achievement Awards
- 2018: Neville Hogan
- 2017: Nitish Thakor
- 2016: Maryellen Giger
- 2015: Bin He
- 2014: Max A. Viergever
- 2013: Theodore W. Berger
- 2012: Peter Hunter
- 2011: K. Kirk Shung
- 2010: Robert S. Langer
- 2009: Sergio Cerutti
- 2008: Roger Barr
- 2007: Jose Principe
- 2006: Jean-Louis Coatrieux
- 2005: Ewart Carson
- 2004: Michael R. Neuman
- 2003: Ante Santic
- 2002: Willis J. Tompkins
- 2001: John G. Webster
- 2000: Max Schaldach
- 1999: Fernand A. Roberge
- 1997: J. Lawrence Katz
- 1996: Max E. Valentinuzzi
- 1995: Floyd Dunn
- 1994: Wilson Greatbatch
- 1993: John M. Reid
- 1992: Edwin L. Carstensen

#### Early Career Achievement Award
- 2018: Carmen Poon
- 2017: Chulhong Kim
- 2016: Lei Ding
- 2015: Danielle S. Bassett
- 2014: Qi Wang
- 2013: Muhammad H. Zaman
- 2012: Utkan Demirci
- 2011: Jose M. Carmena
- 2010: Dario Farina
- 2009: Silvestro Micera
- 2008: Ali Khademhosseini
- 2007: Tejal Desai
- 2006: Alejandro Frangi
- 2005: Stephen Boppart
- 2004: Susan Hagness
- 2003: Paolo Vicini
- 2002: Dorin Panescu
- 2001: David Beebe
- 2000: James Collins
- 1999: Zhi-Pei Liang
- 1997: Metin Akay
- 1996: Joan E. Sanders
- 1995: Atam P. Dhawan
- 1993: Rory A. Cooper
- 1992: Yitzhak Mendelson
- 1991: Blake Hannaford
- 1990: Janie M. Fouke
- 1988: Yongmin Kim
- 1986: George V. Kondraske
William J. Morlock Award
- 2017: Ali Khademhosseini
- 2012: Reese S. Terry, Jr.
- 2011: Rahul Mehra
- 2010: Mark Kroll
- 2009: Dorin Panescu

Distinguished Service Award
- 2018: No Award Given
- 2016: Bruce Wheeler
- 2015: Zhi-Pei Liang
- 2014: Bin He
- 2013: Donna Hudson
- 2011: Maximus A. Viergever
- 2010: Yongmin Kim
- 2008: Henrietta Galiana
- 2007: Nathalie Gosset
- 2006: Yuan-Ting Zhang
- 2005: Jose Principe
- 2004: John Enderle
- 2003: Christian Roux
- 2002: Swamy Laxminarayan
- 2001: Metin Akay
- 2000: Jack Iverson
- 1999: Jean–Louis Coatrieux
- 1998: Susan M. Blanchard
- 1996: Michael R. Neuman
- 1995: Charles Robinson
- 1994: Barry Feinberg
- 1993: Eli Fromme
- 1992: Swamy Laxminarayan
- 1990: Alvin Wald
- 1983: Eli Fromme

Technical Field Awards
- 2018: Elliot McVeigh
- 2018: Ellis Fan-Chuin Meng
- 2017: Guang-Zhong Yang
- 2017: Anant Madabhushi
- 2016: Stephen Boppart
- 2016: Jeffrey Fessler
- 2015: Nigell Lovell
- 2015: Russell H. Taylor
- 2014: Brian T. Cunningham
- 2014: Zhi-Pei Liang
- 2013: Nicolas Chbat
- 2013: Ali Khademhosseini
- 2012: Rashid Bashir
- 2011: Michael Unser
- 2011: Lihong Wang
- 2010: Xiaochuan Pan
- 2010: Kenji Sunagawa
- 2010: Nitish Thakor
2018 EMBC Student Paper Competition

Geographic Finalists

North America
Sina Miran
University of Maryland, College Park
Real-Time Decoding of Auditory Attention from EEG via Bayesian Filtering

Europe
Beatrice Barra
University of Fribourg
Selective Recruitment of Arm Motoneurons in Nonhuman Primates Using Epidural Electrical Stimulation of the Cervical Spinal Cord

Asia –Pacific
Seongyeon Kim
Korea Advanced Institute of Science and Technology (KAIST)
Improved Target Specificity of Transcranial Focused Ultrasound Stimulation (TFUS) Using Double-Crossed Ultrasound Transducers

Middle East-Africa
Mohamed A. Bahloul
King Abdullah University of Science and Technology
Three-Element Fractional-Order Viscoelastic Arterial Windkessel Model

South America
Lucas Fonseca
Universidade de Brasília
Investigating Upper Limb Movement Classification on Users with Tetraplegia as a Possible Neuroprosthesis Interface
Open Finalists

Michael Langenmair
Universitätsklinikum Freiburg
Low Temperature Approach for High Density Electrical Feedthroughs for Neural Implants Using Maskless Fabrication Techniques

Christine F Martindale
Friedrich-Alexander-Universität Erlangen-Nürnberg
Mobile Gait Analysis Using Personalised Hidden Markov Models for Hereditary Spastic Paraplegia Patients

Nil Zeynep Gurel
Georgia Institute of Technology
Unobtrusive Heartbeat Detection from Mice Using Sensors Embedded in the Nest

Dung Phan
Deakin University
Effect of Parkinsonism on Proximal Unstructured Movement Captured by Inertial Sensors

Alejandro Azocar
University of Michigan
Perception of Mechanical Impedance During Active Ankle and Knee Movement

Mohammadjavad Eslamian
University of Houston
Direct Measurement of Mass Transport in Actuation of Conducting Polymers Nanotubes

Giulia Gerboni
University of Melbourne
Cortical Brain Stimulation with Endovascular Electrodes

Chen-Ying Hung
National Tsing Hua University
Improving Young Stroke Prediction by Learning with Active Data Augmenter in a Large-Scale Electronic Medical Claims Database

Enzo Mastinu
Chalmers - University of Technology
Myoelectric Signals and Pattern Recognition from Implanted Electrodes in Two TMR Subjects with an Osseointegrated Communication Interface

Ravikiran Mane
Nanyang Technological University
Quantitative EEG As Biomarkers for the Monitoring of Post-Stroke Motor Recovery in BCI and Tdcs Rehabilitation
EMBS Student Paper Competition Award Recipient:

First Place Award Recipient:  
Gabriela Torres  
University of North Carolina, Chapel Hill & North Carolina State University

Second Place Award Recipient:  
Soojin Lee  
University of British Columbia

Third Place Award Recipient:  
Eli Kinney-Lang  
University of Edinburgh
The IEEE Engineering in Medicine and Biology Society advances the application of engineering sciences and technology to medicine and biology, promotes the profession, and provides global leadership for the benefit of its members and humanity by disseminating knowledge, setting standards, fostering professional development, and recognizing excellence.

The field of interest of the IEEE Engineering in Medicine and Biology Society is the application of the concepts and methods of the physical and engineering sciences in biology and medicine. This covers a very broad spectrum ranging from formalized mathematical theory through experimental science and technological development to practical clinical applications. It includes support of scientific, technological and educational activities.

**PUBLICATIONS**

IEEE PULSE: A Magazine of the IEEE Engineering in Medicine and Biology Society
Transactions on Biomedical Engineering
Journal of Biomedical and Health Informatics
Life Sciences Letters
Transactions on Neural Systems and Rehabilitation Engineering
Transactions on Medical Imaging
Transactions on NanoBioscience
Transactions on Computational Biology and Bioinformatics
Transactions on Computational Imaging
Transactions on Biomedical Circuits and Systems
Reviews on Biomedical Engineering
Journal on Translational Engineering in Health & Medicine
IEEE Transactions on Radiation and Plasma Medical Sciences
Journal on Electromagnetics, RF & Microwaves in Medicine
Electronic Products

**ELECTRONIC PRODUCTS**

EMBS Electronic Resource

**CONFERENCES**

Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)
IEEE EMBS Special Topic Conference on Neural Engineering (NER)
International Symposium on Biomedical Imaging (ISBI)
International Conference on Biomedical Robotics and Biomechatronics (BIOROB)
International Conference on Rehabilitation Robotics (ICORR)
Healthcare Innovation and Point-Of-Care Healthcare Technologies Conference (HICPT)
EMBS Micro and Nanotechnology in Medicine (MNM)
IEEE EMBS International Conference on Body Sensor Networks (BSN)
IEEE EMBS International Conference on Biomedical and Health Informatics (BHI)
IEEE EMBS Student Conferences: For Students, By Students
Grand Challenges Conference Series (GCBIE)

**SUMMER SCHOOLS sponsored by EMBS**

International Summer School on Biomedical Imaging
International Summer School on Biomedical Signal Processing
International Summer School on Biocomplexity, Biodesign and Bioinnova
International Summer School on Information Technology in Biomedicine
International Summer School on Emerging Technologies and Applications in Telemedicine
International Summer School on Neural Engineering
International Summer School on Computer Modeling in Medicine
Notes: