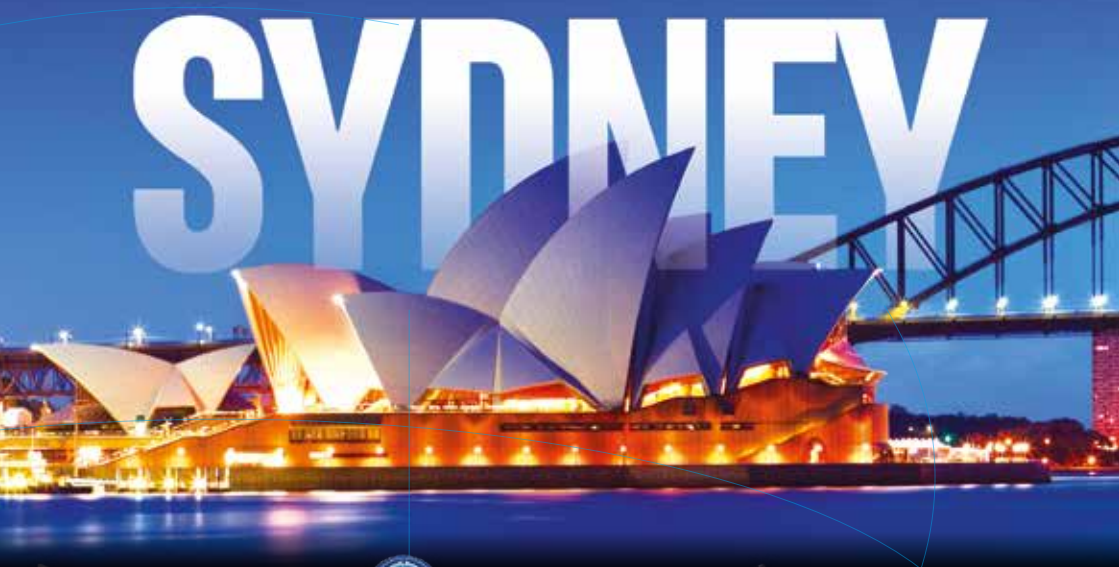
ins
International Neuromodulation Society

Neuromodulation
Leading a Global Medical Revolution



PROGRAM BOOK

INS 14TH WORLD CONGRESS

25-30 MAY 2019, SYDNEY, AUSTRALIA

WWW.NEUROMODULATION.COM

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International Neuromodulation Society

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CONTENTS

RECOGNITION, ACKNOWLEDGEMENTS AND INDUSTRY SUPPORT

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#INS2019

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Jon Hagedorn
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Pick up your "I Tweet #INS2019" Ribbon at the registration desk.

THE INTERNATIONAL NEUROMODULATION SOCIETY WELCOMES YOU TO ITS 14TH WORLD CONGRESS

PRESIDENT'S WELCOME MESSAGE

I am honored to welcome you to the 14th World Congress of the International Neuromodulation Society: Neuromodulation Leading a Global Medical Revolution. This title might seem like hyperbole but, in fact, it may only understate the growing impact of neuromodulation on the treatment of disease. The growth in our understanding of the pathophysiology of chronic illnesses, the mechanisms of action of neuromodulation therapies and the sophisticated technology with which to administer neuromodulation therapy has led to a virtual explosion of the indications for neuromodulation therapies. This is the exciting framework for our conference here in Sydney, Australia.

Dr. Marc Russo and his team have created a state of the art, comprehensive and fascinating program that addresses our field from several viewpoints. For our patients and the press, there is a Public Education Program, moderated by the esteemed Dr. Sally Cockburn, which will address the opioid problem and neuromodulation for chronic pain, urologic and movement disorders. For students, the NSANZ and INS cadaver workshops will train early practitioners in multiple neuromodulation procedures. Our pre-conference Innovation Day will address disruptive innovation in neuromodulation and will present a window to the future of our field. A second pre-conference on Non-Invasive Brain Stimulation provides emphasis on this increasingly impactful segment of neuromodulation therapy.

Following all this, Dr. Russo and colleagues have put together an impressive conference program to address questions that are important to all of us. Evidence will be presented describing the state of the art of existing neuromodulation therapies including spinal cord, peripheral nerve, dorsal root ganglion and brain stimulation as well as up to the minute innovations in waveforms, pulse trains, closed loop feedback and device design destined to advance our field. Special emphasis on clinical trial design and interpretation, critical for growing the evidence basis for neuromodulation, has been included. New and exciting work on the mechanisms of action of our therapies will be presented. Exciting new applications of neuromodulation including rehabilitation medicine and stroke, pelvic motility disorders, disorders of vagal tone, epilepsy and migraine headache will also be discussed.

Clearly, the 14th World Congress of the INS is a massive undertaking as neuromodulation is leading a global medical revolution. With the tremendous work of Dr. Russo and the scientific program and local organizing committees, Tia Sofatzis, INS Executive Director, the INS staff, and Kenes Group, our meeting organization provider, it is on track to be our best meeting yet. It is with great excitement and humility that the Executive Board Members and I welcome you to Sydney!

Robert M. Levy, MD, PhD

President, International Neuromodulation Society

INS 2019 CONGRESS CHAIR WELCOME MESSAGE

G'Day! I wish to extend a warm Aussie welcome to all of you attending our 14th International Neuromodulation Society World Congress here in Sydney. It is the first time the INS congress has taken place in the Southern Hemisphere so quite the occasion for us and the INS. The mission of our meetings is to showcase the highest level of neuromodulation research and clinical practice, and bring together clinicians, researchers and industry collaborators to disseminate their knowledge and establish a global highway of communication and collaborations. As our field expands at a seemingly ever-increasing rate, this meeting acts as an anchor and reference point from which to survey the landscape of neuromodulation and take stock. The INS aims for it to be, and remain, the premier scientific meeting in this field. We hope that this charter will continue to be met and exceeded here in Sydney with your input and contributions.

The bulk of the programme reflects the state of the field as it is today, and it is a very exciting field indeed. When I look back on my own 21-year career in neuromodulation to where things were less than a generation ago, I could never have envisioned the changes that have taken place nor the directions in which the field has moved. The only constant that perhaps has not changed qualitatively is the issue of patient access, and that remains a burning light that we must raise to ensure that those who need these therapies gain access to them.

The programme is loosely divided into streams centred around pain, brain and organ function. Plenaries in the morning followed by oral presentations, lunchtime symposia, and poster abstracts in the afternoon. There is much to feast on here; ensure that you pace yourselves!

In addition, we have two preconference sessions: Noninvasive Brain Stimulation, where both reviews and breakthrough approaches to noninvasive brain stimulation will be featured, put together by Eric Wasserman and Paul Fitzgerald. Also, we have the pre-conference on innovations in neuromodulation, organized and chaired by Konstantin Slavin, that showcases cutting edge technology, new research and the early results while exploring the effects of disruption on biomedicine.

The Neuromodulation Society of Australia and New Zealand (NSANZ) with the INS will co-host a cadaver workshop -- both didactic and practical, chaired by James Yu -- for early career implanters, and we expect this to be very popular with the excellent facilities at Macquarie University. We are also featuring a public education event to promote knowledge of neuromodulation and explore patient access issues, chaired by Nick Christelis. A special symposium at the end of the meeting, Neuromodulation in Asia, will feature presenters from the Asia-Pacific showcasing their work and an excellent opportunity for networking.

I was humbled and honoured when the INS Board of Directors asked if I was prepared to chair this meeting. I was also naïve enough not to enquire how much work was involved! But a meeting such as this, more than two years in the planning, does not occur without a massive amount of hard work from a legion of people. Firstly, I would like to thank all the attendees for without your sacrifice of taking time out from busy professional lives, we would not have a meeting. I would like to thank our faculty presenters who have cheerfully accepted the burden of preparing presentations, it has been a pleasure working with you. I would like to thank the Scientific Committee, the Section Chairs and both the abstract and oral presentation reviewers who have guided the programme into existence and have been instrumental in maintaining the high standard of the programme. I would like to thank our Scientific Oversight Committee, who have reviewed the programme for conflicts of interest from start to finish, and have guided the process to obviate commercial bias. From all of you it has been a mountain of work willingly embraced and delivered. The INS Executive Board and our President Robert Levy have given me valuable guidance which has made my job much easier (and less stressful!). I would like to thank the Local Organising Committee of NSANZ, headed by the NSANZ President Richard Sullivan, for all their efforts, which have dovetailed into making things run smoothly. Our Industry partners deserve thanks for their sponsorship level support making an event of this scale possible, as do the exhibitors supporting an innovation-rich exhibition hall. In a collaborative field like neuromodulation, it is important to preserve true collegial scientific collaboration for patient advancement. I would like to thank Kenes Group our conference organiser for a wonderful job of making everything happen the way it should for a global meeting, and I especially would like to thank Tia Sofatzis and the rest of the INS executive team for unstinting work and unwavering support in bringing this meeting to fruition.

I hope you find time to sample the delights of Sydney as one of the premier cities of the world (okay, I'm biased here, it is my birth city) and, time permitting, some of the experiences that Australia can offer you - from our landscapes to our open and engaging people and culture.

If you go home from this meeting invigorated with the potential that neuromodulation has to bring to restore function and relieve pain, armed with the evidence of the clinical trial base, enriched and nourished by renewing old friendships and the delight of making new ones, and realising that wherever we are in the world we share common bonds of endeavour, then this 14th World Congress has done its job. I wish you a warm welcome and stay and a fruitful meeting.

Marc Russo, MBBS, DA, FANZCA, FFPMANZCA

Congress Chair

ABOUT THE CONGRESS

CONGRESS OBJECTIVES

Following completion of the Congress, participants will be better able to:

1. Apply new scientific data and clinical guidelines to improve patient selection and treatment outcomes for neuromodulation.
2. Identify potential benefits, limitations and complications of neuromodulation therapies.
3. Interpret study results based on trial design and apply lessons learned for application in the design of future trials.
4. Analyze psychological/psychiatric factors affecting outcomes in the treatment of chronic pain, movement disorders, cognitive and other disorders.
5. Describe the bioengineering challenges and solutions at the neural interface, fundamentals and mechanisms of action of neuromodulation.
6. Discuss and analyze the anatomy and physiology of the central CNS, peripheral and autonomic nervous systems to assist in patient selection, target selection and likelihood of therapeutic success.
7. Discuss the uses of devices for functional electrical stimulation including rehabilitation of motor loss, loss of sensory function, and loss of cognitive function.
8. Describe emerging neuromodulation therapies, new paradigms of therapy target selection and associated research in the medical field of neuromodulation.
9. Distinguish mechanisms of disease states, such as complex regional pain syndrome, refractory angina and visceral pain syndromes and explain the current position of neuromodulation in these conditions.
10. Explain the many variations now available for electrical stimulation and how to select the appropriate technology.
11. Describe the increasing application of neuromodulation for chronic heart disease, as well as genitourinary and gastrointestinal disorders.
12. Explain the scientific merit and best practices for the use of intrathecal drug infusions including patient selection, drug selection and complication management.
13. Critically appraise research methodology in neuromodulation and recognize how evolving treatment guidelines and registries are important.
14. Apply the increasing knowledge base for neuromodulation in a wide variety of chronic illness management.
15. Explain how cancer pain management has evolved into managing the pain of cancer survivors and recognize the growing need for neuromodulation solutions.

DISCLOSURE INFORMATION

The INS relies upon course directors, committees, moderators and invited faculty participants in its Congress to provide educational information that is objective and free from bias. Therefore, individuals in a position to control the educational content of this Congress are asked to disclose their relevant financial relationships with any commercial interest for the past three years. Failure to disclose and/or resolve any identified conflicts of interest prior to the commencement of the Congress may result in the withdrawal of the participant's invitation to participate.

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ACTING EDITOR-IN-CHIEF, *NEUROMODULATION: TECHNOLOGY AT THE NEURAL INTERFACE*	Robert D. Foreman, PhD

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Benelux Neuromodulation Society	Monique A. H. Steegers, MD, PhD
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Marc Russo, MBBS, FFPMANZCA
Simon Thomson, MBBS, FFPMRCA, Emeritus Director-at-Large

GENERAL INFORMATION

VENUE

The Sydney Convention and Exhibition Centre (ICC Sydney)
Address: 14 Darling Dr, Sydney NSW 2000, Australia
Tel: +61 2 9215 7100
Website: https://www.iccsydney.com.au/

OPENING HOURS

Date	Registration	Exhibition
Saturday, 25 May	15:00 - 18:00*	
Sunday, 26 May	07:00 - 19:30	18:00 - 19:30 (Opening Reception)
Monday, 27 May	07:00 - 19:00	07:30 - 16:30
Tuesday, 28 May	07:00 - 19:00	07:30 - 16:30
Wednesday, 29 May	07:00 - 18:30	07:30 - 16:30
Thursday, 30 May	07:30 - 13:30	Closed

*Registration Desk for Noninvasive Brain Stimulation (NIBS) Pre-Conference is open from 08:30 and is located at the entrance to the Parkside Ballroom.

NAME BADGES

All participants and exhibitors are kindly requested to wear their name badges throughout the Congress in order to be admitted to the lecture halls and scheduled activities.

WI-FI SERVICES

Wi-Fi connection is available throughout the venue for congress participants.
Network name: **INS-2019** | Password: **ins-2019**

MOBILE APP

Download the INS 2019 Interactive mobile app to your smartphone and portable devices to access all the information you will need during the congress:

- See the overview of sessions, speakers, and supporters.
- Create your own schedule for the event, including bookmarking the sessions you wish to attend.
- Receive real-time updates.

Download the INS App now to enhance your congress experience! (Available on the App Store or Google Play: INS Congress).

FOOD AND BEVERAGE

Coffee and light refreshments are served to registered participants throughout the congress in the Posters and Exhibition Area (Hall 1) as indicated in the Scientific Program.

MOBILE PHONES

Mobile phones must be switched off or muted during all sessions.

CONGRESS PROCEEDINGS IN NEUROMODULATION ONLINE JOURNAL

The Congress abstracts will be published on the INS member website and in the online version of the INS's journal, *Neuromodulation: Technology at the Neural Interface*, later this year.

How to Cite:

International Neuromodulation Society's 14th World Congress: Leading a Global Medical Revolution, Sydney, Australia May 25—30, 2019. Neuromodulation: Technology at the Neural Interface, 2019;22: doi:10.1111/ner.12958.

***Neuromodulation*: online for members:** http://www.neuromodulation.com/login

***Neuromodulation*: online for non-members:** www.neuromodulationjournal.com

CME/CPD CERTIFICATE

After the Congress, all registered participants will receive an email with a link to the Congress evaluation and credit claiming procedure. Your CME/CPD certificate will be delivered electronically after completing the educational evaluation and credit claiming procedure. For more information, please see page 40.

GUEST ATTENDANCE POLICY

All event activities (including educational sessions, meal functions, exhibition hall, etc.) are exclusively reserved for registered participants. Non-registered guests (including children, family members, colleagues, etc.) are not allowed in any of the event areas. Badges provided at registration are required for entrance into all functions and is strictly enforced.

CLOAKROOM

A cloakroom is available for the use of the Congress participants and is located on the ground floor of the Convention Centre.

LIABILITY AND INSURANCE

The Congress Secretariat and Organizers cannot accept liability for personal injury or damage involving persons and property during the Congress. Participants are advised to take out their own personal travel and health insurance.

SAFETY AND SECURITY

Please do not leave bags or suitcases unattended at any time, whether inside or outside session halls. Hotels strongly recommend that you use their safety deposit boxes for your valuables.

RECOGNITION, ACKNOWLEDGEMENTS AND INDUSTRY SUPPORT

In accordance with compliance regulations, Industry supporting the Congress is acknowledged separately from the Scientific Program. Industry information appears in the back of the Program Book under the heading RECOGNITION, ACKNOWLEDGEMENTS AND INDUSTRY SUPPORT.

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GIANTS OF NEUROMODULATION AWARDS

INS FIFTH GIANT OF NEUROMODULATION AWARDS

At our biennial meeting, the International Neuromodulation Society presents its greatest honor: The Giants of Neuromodulation Award. This special recognition is bestowed upon individuals who have had a life-long dedication to the field of neuromodulation and whose work in research, education and advocacy has had an indelible impact upon our field. In May 2019, at the 14th World Congress of the INS in Sydney, Australia, we will honor two giants upon whose shoulders the field now stands: Professor Michael Cousins and Doctor Richard North.

Both Prof. Cousins and Dr. North have dedicated much of their careers to improving the lives of people who live with chronic pain. Strong proponents of evidence-based medicine, they have educated those within and outside of the field with their seminal publications, shaping how chronic pain is understood and treated with neuromodulation therapies.

"IF I HAVE SEEN A LITTLE FURTHER, IT IS BY STANDING ON THE SHOULDERS OF GIANTS."

Sir Isaac Newton, 1676

PROFESSOR MICHAEL COUSINS

Emeritus Professor Michael Cousins, early in his career, chose the path of pain medicine as an anaesthetist. He spent a decade working with the great luminaries of the time such as Philip Bromage, Richard Mazze, Ronald Melzack, Patrick Wall and John J Bonica. He returned to Australia in 1975 and set about changing the practice and structure of pain medicine in Australia - a project he continued over the next 40 years. He has published over 230 papers spanning the last 47 years plus numerous book chapters and textbooks. He has done seminal research work and organisational work in the fields of anaesthesia, pain medicine and neuro-modulation. His work in intrathecal analgesia started in the late 1970s and progressed to understanding the nature of spinal cord injury pain. He has pioneered the concept of pain as a disease in its own right and commenced the seminal basic science research on closed loop spinal cord stimulation. Besides the generations of neuromodulators that he has taught and fostered in the two world class pain units that he established, it is in the organisational work that he has especially left a lasting impression on the neuromodulation landscape. He has been Foundation Professor in Adelaide, and Foundation Professor at Royal North Shore Hospital in Sydney, Australia, as well as the founding President of the Australian Pain Society and the President of the International Association for the Study of Pain (IASP), where he helped forge an official relationship between the IASP and the World Health Organization (WHO). He was the Inaugural Dean and founder of the Faculty of Pain Medicine of Australia in 1999, which has been unique worldwide in bringing together five specialty bodies to oversee a single training programme and examination leading to a specialist qualification in pain medicine. Prof. Cousins has been the recipient of numerous awards, honours and accolades in his professional work, including being awarded an Officer of the Order of Australia in 2014.

DOCTOR RICHARD NORTH

Dr. Richard North has been instrumental in the development of the field of neuromodulation with a career spanning more than 30 years. Spending his entire academic career at the Johns Hopkins University School of Medicine, he directed the Neurosurgery Spine Service and co-directed the Division of Functional Neurosurgery. He rose to the rank of Professor of Neurosurgery, Anesthesiology and Critical Care Medicine. While Dr. North has published over 130 papers, it is their high quality and impact that most impress. For example, Dr. North was the first to demonstrate the linear relationship between paresthesia overlap and pain relief with spinal cord stimulation. His sentinel publications reporting a randomized controlled trial of spinal cord stimulation versus spinal reoperation profoundly altered our thinking about failed back surgery syndrome: spinal cord stimulation was demonstrated to provide significantly better pain relief and was significantly less costly.

The American Academy of Pain Medicine (AAPM) has recognized Dr. North with the AAPM Founder's Award. Dr. North was the president of the North American Neuromodulation Society (NANS) in 2004 – 2005 and received the NANS Lifetime Achievement Award. Since his retirement, Dr. North co-founded and serves as president of The Neuro-modulation Foundation and has produced WIKISTIM, a searchable website that serves as the most comprehensive reference database in neuromodulation. These and his many other achievements have cemented his position in the hall of the Giants of Neuromodulation.

INTERNATIONAL NEUROMODULATION SOCIETY AND CHAPTER EVENTS

NEUROMODULATION SOCIETY OF AUSTRALIA AND NEW ZEALAND CADAVER WORKSHOP ON RADIOFREQUENCY PROCEDURES
May 25-30, 2019 **Sydney, Australia** https://dcconferences.eventsair.com/nsanzcw2019/

CANADIAN NEUROMODULATION SOCIETY 11TH ANNUAL MEETING
June 30 - July 2, 2019 **Iqaluit, Nunavut, Canada** https://neuromodulation.ca/meetings/

ANNUAL MEETING OF THE CHINESE NEUROMODULATION SOCIETY
Aug. 31 - Sep. 1, 2019 **Kunming, China** https://www.neuromodulation.com/china

NORDIC NEUROMODULATION SOCIETY'S 6TH ANNUAL MEETING
Oct. 3-4, 2019 **Aarhus, Denmark** http://nordicneuro.org/documents/nns/Program%20NNS%202019.pdf

NEUROMODULATION SOCIETY OF THE UK AND IRELAND ASM AND HANDS-ON CADAVER WORKSHOP
Nov. 15-17, 2019 **Leeds, England, United Kingdom**
https://www.painandneuromodulationlondon.com/2018/11/15-17-nov-2019-nsuki-asm-hands-on.html

NORTH AMERICAN NEUROMODULATION SOCIETY ANNUAL MEETING
Jan. 23-26, 2020 **Las Vegas, Nevada, USA** https://neuromodulation.org/Meetings/2020AnnualMeeting.aspx

ANNUAL MEETING OF THE INS SPAIN
Feb. 21-22, 2020 **Madrid, Spain** www.neuromodulation.es

MEETING OF THE NATIONAL NEUROMODULATION SOCIETY IN RUSSIA
Spring 2020 **Russia** https://www.neuromodulation.com/russia

NEUROMODULATION SOCIETY OF AUSTRALIA AND NEW ZEALAND ANNUAL SCIENTIFIC MEETING
Aug. 8-9, 2020 **Brisbane, Australia** www.dcconferences.com.au/nsanz2020

INTERNATIONAL NEUROMODULATION SOCIETY 2020 INTERIM MEETING IN MUMBAI, HOSTED BY THE NEUROMODULATION SOCIETY OF INDIA
Oct. 23-25, 2020 **Mumbai, India** www.ins-im2020.com

NORTH AMERICAN NEUROMODULATION SOCIETY ANNUAL MEETING
Jan. 14-17, 2021 **Orlando, Florida, USA** https://neuromodulation.org/Meetings

INTERNATIONAL NEUROMODULATION SOCIETY 15TH WORLD CONGRESS
May 1-6, 2021 **Barcelona, Spain** http://www.neuromodulation.com/ins-congress

INS-IM 2020

INS INTERIM MEETING

MUMBAI • 23rd - 25th OCT, 2020

Pushing the Boundaries of Neuromodulation

ins International Neuromodulation Society

tns THE NEUROMODULATION SOCIETY OF INDIA
A CHAPTER OF THE INTERNATIONAL NEUROMODULATION SOCIETY ins

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YOUR GATEWAY TO THE WORLD OF NEUROMODULATION

Venue - Grand Hyatt Mumbai, India

www.ins-im2020.com | info@ins-im2020.com

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11th Floor, Jaslok Hospital and Research Centre, 15, Dr. Deshmukh Marg,
Mumbai - 400 026
Phone: +91 98200 63854

Scan the QR Code to know more

NONINVASIVE BRAIN STIMULATION (NIBS) PRE-CONFERENCE

SATURDAY, 25 MAY, 2019 PARKSIDE BALLROOM

Repetitive transcranial magnetic stimulation (rTMS) has been available for nearly thirty years, its basic neuromodulatory mechanisms are understood, and its methods well developed. It has been applied successfully in psychiatric disorders, chronic pain, hemiparesis, and other disorders and provided a powerful set of interventional tools for neuroscientists studying human brain function. However important questions remain unanswered and the field has lagged in applying current standards of therapeutics development. Recently, however, powerful advances in other fields of neuroscience have provided ways to address these challenges and develop new and exciting approaches.

This pre-conference will focus on work combining rTMS with functional and structural MRI, EEG, and modeling to:

- target brain networks instead of areas
- establish markers of target engagement
- test mechanistic hypotheses
- provide patient-individualized anatomical targets
- optimize delivery across multiple parameters

The panel are long-established and younger leaders in human neuroscience and brain stimulation from clinical and basic disciplines. The presentations will be suitable for a general clinical neuroscience audience and there will be ample time for questions and discussions.

OBJECTIVES

1. Discuss the challenges in developing targeted noninvasive brain stimulation approaches to clinical and research problems.
2. Explore the opportunities presented by functional imaging and other measures for quantifying and targeting rTMS.
3. Apply new noninvasive paradigms for modulating brain networks and systems
4. Demonstrate how neuroscience approaches used to understand brain networks and circuits can be applied to the development of novel brain stimulation therapeutic interventions.

PROGRAM

Time	Presentation
08:30 - 09:30	Breakfast and Posters
09:00 - 09:40	**Noninvasive Deep Brain Stimulation via Temporally Interfering Electric Fields** Nir Grossman, PhD
09:40 - 10:20	**Individualized and Novel Approaches in Brain Stimulation for Posttraumatic Stress Disorder** Noah S. Philip, MD
10:20 - 11:00	**Can Oscillatory Synchrony be Used to Guide rTMS Treatment?** Andrew Leuchter, MD
11:00 - 11:30	Break and Posters
11:30 - 12:10	**Translational Advances in Therapeutic rTMS: An Era of Rapid Progress** Jonathan Downar, MD, PhD
12:10 - 12:50	**Targeting Learning Networks with Transcranial Magnetic Stimulation** Eric Wassermann, MD
12:50 - 14:20	Lunch and Posters
14:20 - 15:00	**Advancing Noninvasive Brain Stimulation for Depression with Personalised Treatment Approaches** Paul Fitzgerald, MBBS, PhD
15:00 - 15:40	**Circuit Therapeutics for the Treatment of Dementia: A Randomised Controlled Trial of Theta Burst Stimulation for Mild to Moderate Alzhheimer's Disease** Kate Hoy, DPsych (Clin Neuro)
15:40 - 16:10	Break and Posters
16:10 - 16:50	**Preclinical Studies of Brain Stimulation: Can we Learn from Animal Models?** Jennifer Rodger, PhD
16:50 - 17:00	Closing Comments

PROGRAM AT A GLANCE

SUNDAY, 26 MAY 2019

18:00 - 19:30	INS Congress Opening Reception in the Exhibition Area

MONDAY, MAY 27 2019

	Pyrmont Theatre	
07:30 - 08:00	Morning Coffee and Pastries in the Exhibition Area (Hall 1)	
08:00 - 11:30	**Opening Plenary Session**	
	Moderators: Michael Stanton-Hicks, MBBS, Dr. Med. and Richard Sullivan, MBChB, FFPMANZCA	
08:00 - 08:30	**Welcome and INS Leadership Message**	
08:30 - 08:50	**Novel Model of Brain Function** Dirk De Ridder, MD, PhD	
08:50 - 09:15	**Non-Surgical Deep Brain Stimulation** Nir Grossman, PhD	
09:15 - 09:40	**A Critical Analysis of Clinical Trials in Neuromodulation** Sam Eldabe, MBBS, FRCA	
09:40 - 10:00	**Closed-loop Spinal Cord Stimulation: Evoke Study Results** Lawrence Poree, MD, PhD	
10:00 - 10:25	Break, Posters and Exhibits in the Exhibition Area (Hall 1)	
10:30 - 10:50	**Blinded Randomized Controlled Trial on Waveforms: The SURF Study** Robert Bolash, MD	
10:50 - 11:10	**Multifidis Peripheral Nerve Stimulation Randomized Controlled Trial** Christopher Gilligan, MD, MBA	
11:10 - 11:30	**Anatomical Lead Placement is a Viable Alternative to Targeted Lead Placement for Spinal Cord Stimulation: Results from a Prospective, Randomized, Single-Blinded, Multi-Center, International, Study** Jason E. Pope, MD, FIPP	
11:30 -12:20	**Oral Poster Presentations Five Best Abstracts**	
	Moderators: Marc Russo, MBBS, FFPMANZCA, Nick Christelis, FFPMANZCA, FFPMRCA and Paul Verrills, MM(Pain Med), FIPP	
11:30 - 11:40	**Long-Term Results from The Avalon Study — Feedback-Controlled SCS Using Evoked Compound Action Potentials** Charles Brooker, MBCHB MRCP	
11:40 - 11:50	**A Comparison of Behavior and Report of Gene Expression Modulation of Waveform-Dependent Spinal Cord Stimulation in a Rat Model of Neuropathic Pain** David Cedeno, PhD	
11:50 - 12:00	**Modulation of the Neuroglia Interaction using Differential Target Multiplexed Spinal Cord Stimulation in an Animal Model of Neuropathic Pain** Ricardo Vallejo, MD, PhD	
12:00 - 12:10	**Opioid Dose Reduction after Spinal Cord Stimulation** Nandan Lad, MD, PhD	
12:10 - 12:20	**Personalized, Closed-Loop Deep Stimulation for Refractory Chronic Pain** Prasad Shirvalkar, MD, PhD	
12:30 - 14:30	Lunch, Posters and Exhibits in the Exhibition Area (Hall 1)	**Parkside Ballroom** Sponsored Lunch Symposium (no CME/CPD credit) - see page 53 (12.35 - 13:35)

Plenary	Breakout Session	Oral Presentations	Supported Symposium	Special Session
Meeting	Award Ceremony	Networking Event	Exhibit Break/Poster Viewing	

	Pyrmont Theatre	Room C4.4	Room C4.5
14:30 - 16:00	**Improving Delivery of Neuromodulation for Pain**	**Brain Neuromodulation**	**Cardiovascular Neuromodulation**
	Moderator: Julie Pilitsis, MD, PhD	Moderators: Christopher Honey, MD, DPhil and Fabian Piedimonte, MD, FIPP	Moderator: Mike JL DeJongste, MD, PhD
14:30 - 14:45	**What is on the Horizon for Stimulation Patterning?** Robert M. Levy, MD, PhD	**Adaptive Stimulation in Deep Brain Stimulation** Terry Coyne, MD	**What's Hot and What's not in Neuro-modulation for Cardiac Diseases** Mike JL DeJongste, MD, PhD
14:45 - 15:00	**Adding Objective Markers to Spinal Cord Stimulation Assessments** Julie Pilitsis, MD, PhD	**Rhythms of the Brain** Peter Silburn, MD	**Basic Mechanisms of Vagal Modulation in Cardiac Diseases** Jeffrey Ardell, PhD
15:00 - 15:15	**Common Research Questions for SCS Research and How to Answer them** Nathaniel Katz, MD, MS	**Deep Brain Stimulation for Obesity** Daniel A. N. Barbosa, MD	**Basic Mechanisms of Spinal Cord Stimulation in Cardiac Diseases** Robert D. Foreman, PhD
15:15 - 15:30	**Systematic Troubleshooting Intrathecal Delivery Systems: Emerging Tools** Michael Saulino, MD, PhD	**Deep Brain Stimulation for Eating Disorders** Bomin Sun, MD, PhD	**Anesthetic Considerations and Perioperative Management of SCS** Michael E. Harned, MD
15:30 - 15:45	**Animal Models of Paresthesia-Based SCS and Sub-perception-SCS and Clinical Correlates** Glenn Franken, MS	**Deep Brain Stimulation for Addiction** Chencheng Zhang, MD, PhD	**Clinical Outcomes of Neuromodulation for Angina** Hans van Suijlekom, MD, PhD
15:45 - 16:00	Discussion	Discussion	Discussion
16:00 - 16:30	Break, Posters and Exhibits in the Exhibition Area (Hall 1)		
16:30 - 18:20	**Oral Poster Presentations**		
	Moderators: G. Baranidharan, FRCA, FFPMRCA and Nuri Süleyman Ozyalcin, MD, FIPP	Moderators: Alessandro Dario, MD and Dirk Rasche, MD, PhD	Moderators: Alexandre Amaral, MD and Carlos Tornero, MD, PhD
16:30 - 16:40	**Evoked Compound Action Potential Recording to Further Understand Effect of Titrating Medication with Spinal Cord Stimulation** Steven Rosen, MD	**Revision of Responsive Neurostimulation Devices for Neuromodulation of Epilepsy at a Single Institution** Lora Kahn, MD	**First Experience in SCS with Combination Therapy and Novel Algorithm for Dorsal Horn Modulation** Maria Teresa Di Dato
16:40 - 16:50	**Outcomes of a Prospective Randomized Controlled Trial Utilizing a Spinal Cord Stimulation System Capable of Multiple Neurostimulation Modalities (Combo Study)** James North, MD	**Deep Brain Stimulation in Patients with Anorexia Nervosa. Preliminary Results of the Clinical Trial NCT03168893** Gloria Villalba, MD	**Treatment of Neck and Upper Limb Pain using Burst Spinal Cord Stimulation** Adnan Al-Kaisy, FRCA, FFPMRCA
16:50 - 17:00	**Controlling Spinal Cord Activation During Delivery of SCS Therapy in Patients with High Degree of Movement in the Spinal Canal** Jeff Arle, MD, PhD	**Propagation of TMS-Induced EEG Phase-Locked Information for Assessments of Major Depression** Eri Miyauchi, MD, PhD	**A Prospective Clinical Trial to Assess High Frequency Spinal Cord Stimulation (HF-SCS) at 10 kHz in the Treatment of Chronic Intractable Pain from Peripheral Polyneuropathy** Vincent Galan, MD, MBA

	Pyrmont Theatre	Room C4.4	Room C4.5
17:00 - 17:10	Whisper RCT: An Updated Post-Hoc Evaluation of Sub-Perception SCS at ≤1.2 kHz in Previously-Implanted Subjects James North, MD	Targeting the Human Nucleus Accumbens to Modulate Loss of Control Daniel A. N. Barbosa, MD	Spinal Cord Stimulation at 10 kHz for the Treatment of Chronic Focal Neuropathic Post-Surgical Pain Mayank Gupta, MD
17:10 - 17:20	Spinal Cord Stimulation at 10 kHz for the Treatment of Chronic Pain of the Upper Extremities: Results of a Prospective, Multicenter, Post-Market, Observational Study Kasra Amirdelfan, MD	Psychological Distress Predicts Disability in Neuromodulation Patients Sarah Salo	A Retrospective Evaluation on the Efficacy and Complications of the Use of SCS in Treating Chronic Pain Patients at Leeds Teaching Hospitals Trust (LTHT) Charlotte Romanis
17:20 - 17:30	Automated, Routine Monitoring of Neurophysiological Parameters in Spinal Cord Stimulation Nathan Taylor, MBBS	1.5T vs. 3T fMRI Bold Activation are Comparable in Measurement of DBS effects Julie Pilitsis, MD, PhD	The Long Term Effect of Temporary Spinal Cord Stimulation for Zoster-Related Pain Lizu Xiao, MD
17:30 - 17:40	High Frequency Spinal Cord Stimulation (HF-SCS) at 10 kHz for the Treatment of Chronic Pain Resulting from Spinal Cord Injury Sam Eldabe, MBBS, FRCA	Effect of Long Pulse Width Stimulation and Add-On Cognitive Therapy in Subcallosal Cingulate Deep Brain Stimulation for Treatment Resistant Depression Rajamannar Ramasubbu, MD, FRCPC	Human Dorsal Root Ganglion Stimulation Reduces Sympathetic Outflow and Blood Pressure Ysra B. Sverrisdottir, PhD
17:40 - 17:50	Optimization Techniques for High Frequency 10 kHz Spinal Cord Stimulation Maintain Long-Term Outcomes: Retrospective Analysis of a Randomized Controlled Trial Leonardo Kapural, MD, PhD	Efficacy of Repetitive tDCS on Ad Libitum Smoking Behaviour: An Ecological Momentary Assessment Study Ilse Verveer, MSc	Preliminary Investigation of a Novel Ultrahigh-Frequency Stimulation Paradigm at Dorsal Root Ganglion in Patients with Intractable Back Pain and/or Leg Pain Yeong-Ray Wen, MD, PhD
17:50 - 18:00	A Comprehensive Algorithm for Management of Neuropathic Pain Dan Bates, BMed BSc (Hons)	Beta Power in the Primary Sensorimotor Cortex Correlates with Bradykinesia in Parkinsonian Patients Treated with Bilateral Subthalamic Deep Brain Stimulation Gertrud Tamas, PhD	Real-World Outcomes using a Novel Directional Lead from a Deep Brain Stimulation Registry for Parkinson's Disease Jan Vesper, MD, PhD
18:00 - 18:10	T12 Dorsal Root Ganglion Spinal Cord Stimulation to Treat Chronic Low Back Pain: A Case Series Kenneth Chapman, MD	Magnetic Resonance-Guided Laser Interstitial Thermal Therapy for the Treatment of Non-Lesional Insular Epilepsy in Pediatric Patients: Thermal Dynamic and Volumetric Factors Influencing Seizure Outcomes Chima Oluigbo, MD	Interleaving Stimulation Mode Can Improve Better the Health-Related Quality of Life in Primary Generalized or Segmental Dystonia than Standard Bilateral Pallidal Deep Brain Stimulation Norbert Kovacs, MD, PhD
18:10 - 18:20	Intraoperative Paresthesia-Mapping is not Required for Lead Placements Involving Burst Stimulation: Results of the Prospective, Multicenter, Randomized, Double-Blinded Crisp Study Adnan Al-Kaisy, FRCA, FFPMRCA	Deep Brain Stimulation for Pediatric Dystonia Chima Oluigbo, MD	Outcomes Using an SCS Device Capable of Delivering Combination Therapy (Simultaneous or Sequential) and Advanced Waveforms/Field Shapes James North, MD
18:20 - 18:30	Short Break		

TUESDAY, 28 MAY 2019

	Pyrmont Theatre	Room C4.4
07:30 - 08:00	Morning Coffee and Pastries in the Exhibition Area (Hall 1)	
08:00 - 11:30	Plenary Session	**Allied Health Workshop on Neuromodulation Nurses, Psychologists, Physiotherapists**
	Moderator: Timothy R. Deer, MD	Moderators: Christin Bird, NP, MRes and Rachel Whipp, RN BNurs.
08:00 - 08:30	**Medical Device Monitoring: Where are We and Where do We Need to Go?** Marc Russo, MBBS, FFPMANZCA	Introductions (08:00 - 08:10) Christin Bird,NP, MRes and Rachel Whipp, RN BNurs. Management of Patients Receiving SCS Therapy – The Australian Experience (08:10 - 08:30) Rebecca Kennedy, Dip Nursing
08:30 - 09:00	Neuromodulation Centers of Excellence Robert M. Levy, MD, PhD	Management of Patients Receiving SCS Therapy – The UK Experience (08:30 - 08:50) Carol Bourke, RGN, BHSc (Hons)
09:00 - 09:30	Progress in Brain Machine Interface Leigh Hochburg, MD, PhD	Assessment of Patients Receiving Neuromodulation Therapies (08:50 - 09:20) Simon Prangnell, DClinPsych, PGDip
09:30 - 10:00	Dynamic Computational Model of the Human Spinal Cord Connectome Jeff Arle, MD, PhD	Outcomes from the Implementation of a Post-Implant Rehab Program (09:20 - 09:50) Kristy Stone, AEP, ESSAM
10:00 - 10:30	Break, Posters and Exhibits in the Exhibition Area (Hall 1)	
10:30 - 11:00	Neuromodulation for Visceral Pain Leonardo Kapural, MD, PhD	Growth in Neuromodulation and the Potential Provision for Stronger Nursing Roles (10:30 - 11:00) Rebekah Richards, BSN RN
11:00 - 11:30	Perspectives of Gastrointestinal Neuromodulation Jiande Chen, PhD	Panel Q&A session (11:00 - 11:30)
11:30 - 12:10	INS General Assembly of Members	
12:10 - 12:30	Break, Posters and Exhibits in the Exhibition Area (Hall 1)	
12:30 - 14:30	Lunch, Posters and Exhibits in the Exhibition Area (Hall 1)	**Parkside Ballroom**
		Sponsored Lunch Symposium (no CME/CPD credit) - see page 53 (12:30 - 13:30)

	Pyrmont Theatre	Room C4.4	Room C4.5
14:30 - 16:00	**Basal or Non-Basal: Intrathecal Regimens for 2019**	**Deep Brain Stimulation for Pain**	**New Developments in Neuromodulation for Gastrointestinal Conditions**
	Moderators: Lisa Stearns, MD, CPSC and Michael Saulino, MD, PhD	Moderators: Peter Teddy, FRACS, FFPMANZCA and Stana Bojanic, MBBS, FRCS (SN)	Moderator: Jiande Chen, PhD
14:30 - 14:45	**Tailoring Intrathecal Therapy to Match Your Patient's Needs** Robert Bolash, MD	**Stimulation of the Accumbens Region** André Machado, MD, PhD	**New Methods and Applications Using the Science Underlying GI Neuromodulation: Low and High Resolution Mapping** Leo Cheng, PhD
14:45 - 15:00	**Challenges for Bolus only Therapy** Jason E. Pope, MD, FIPP	**Cingulate Stimulation** Paresh Doshi, MS, MCh	**Electroceuticals for Mapping and Modulating Gut Activity: Towards Closed-loop Management of Gastroparesis** Aydin Farajidiva, PhD
15:00 - 15:15	**Functional Improvement with Continuous Intrathecal Morphine Infusion in Chronic Non-Cancer Pain** Genni Duse, MD	**Deep Brain Stimulation for Pain: Pro and Con** Pro: Richard Bittar, MBBS, PhD Con: Jan Vesper, MD, PhD	**Neuromodulation for Inflammatory Bowel Disease** Bruno Bonaz, MD, PhD
15:15 - 15:30	**Are Side Effects Associated with the Long-Term Usage of Intrathecal Drug Delivery so Frightful?** John A. Hatheway, MD	**Motor Cortex Stimulation for Pain and Related Conditions: Pro and Con** Pro: Robert M. Levy, MD, PhD Con: Richard Bittar, MBBS, PhD	**New Applications for Mid Gut Stimulation for Metabolic Disorders: GI Stimulation for Diabetes and Obesity** Jieyun Yin, MD
15:30 - 15:45	**The Economics of Cancer Related Pain: New Data to Support use of Targeted Drug Delivery for Both Short Term and Long Term Survivors** Lisa Stearns, MD, CPSC		**New Neuromodulation Therapies for Colonic Disorders** Bridget Southwell, PhD, AGAF
15:45 - 16:00	**Novel Intrathecal Analgesics in Cancer Pain** Michael Leong, MD	**Discussion**	**Discussion**
16:00 - 16:30	Break, Posters and Exhibits in the Exhibition Area (Hall 1)		
16:30 - 18:20	**Oral Poster Presentations**		
	Moderators: Monique A.H. Steegers, MD, PhD	Moderator: Philippe Rigoard, MD, PhD and Terry Coyne, MD	Moderators: Murray Taverner, FFPMANZCA, FIPP, FIPP and James Yu, FPMANZCA, FIPP
16:30 - 16:40	**Longitudinal Data from the Targeted Drug Delivery (TDD) Product Surveillance Registry: MRI Risk Mitigation** Lisa Stearns, MD, CPSC	**Pathologic Subthalamic Nucleus Activity in Freezing of Gait in Parkinson's Disease** Matthew Georgiades, MBBS	**Human Gastric Pacing: Slow-Wave Spatiotemporal Response** Saeed Alighaleh, BSc
16:40 - 16:50	**Targeted Drug Delivery and Catheter Tip Location: Is there a Difference in Adverse Events?** Lisa Stearns, MD, CPSC	**Outcomes of a Prospective, Multicenter International Registry of Deep Brain Stimulation for Parkinson's Disease** Jan Vesper, MD, PhD	**Fixing Broken Plumbing with Better Wiring: Anti-Inflammatory Effects of Abdominal Vagus Nerve Stimulation in a Rat Model of Inflammatory Bowel Disease** Sophie Payne, BSc, PhD

	Pyrmont Theatre	Room C4.4	Room C4.5
16:50 - 17:00	Cost Savings Associated with Systemic Opioid Elimination following Initiation of Intrathecal Drug Delivery for Treatment of Chronic Pain in the United States John A. Hatheway, MD	Pain Catastrophisation and Pain Reduction following Neuromodulation Sarah Salo	Comparison between Direct Vagal Nerve Stimulation and Noninvasive Auricular Vagal Nerve Stimulation for Opioid-Induced Constipation Yiling Zhang, PhD
17:00 - 17:10	Why do Patients Discontinue Intrathecal Baclofen Treatment? A Retrospective Service Analysis Natalie Gray	Feasibility and Safety of Remote Deep Brain Stimulation Programming via Internet for Movement Disorders Nan Li, MD, PhD	Effects of Spinal Cord Stimulation on Chronic Refractory Painful Gastroparesis: A Retrospective Case Series Analysis Leonardo Kapural, MD, PhD
17:10 - 17:20	Identification of the Reservoir Access Port of Intrathecal Pumps by Template Versus Ultrasound Guidance: A Pilot Study Camille Matthys	Target Matters: Retrospective Vector Error Analysis of 258 Deep Brain Stimulation Electrodes at Single Institution Heather Pinckard-Dover, MD	Treatment of Chronic Abdominal Pain with 10 KHz SCS: Efficacy Results from a 12-Month Prospective, Multicenter, Feasibility Study in Patients with Diverse Pain Etiologies Leonardo Kapural, MD, PhD
17:20 - 17:30	Motor Stalls with an Implantable Pain Pump Lisa Stearns, MD, CPSC	Double-Target DBS Via Same Lead for Essential Tremor (PSA and Vim Stimulated by Same Lead - Different Contacts) Atilla Yilmaz, MD	Are Burst and 10 KHz Fundamentally the Same? A Prospective, Randomised, Single Blind, Cross Over EEG-Study G. Baranidharan, FRCA, FFPMRCA
17:30 - 17:40	Salvage Therapy of Patients with Chronic Complex Regional Pain Syndrome by Catheter Associated Local Treatment of Peripheral Nerves Werner Ek Braunsdorf, MD	Functional Connectivity Distribution within the Subthalamic Nucleus as an Essential Tool in Deep Brain Stimulation for Parkinson's Disease László Halász, MD	T12 Dorsal Root Ganglion Stimulation to Treat Axial Low Back Pain: Mechanism of Action Kenneth Chapman, MD
17:40 - 17:50	Longitudinal Data from the Targeted Drug Delivery Product Surveillance Registry: Pocket Fill Risk, Identification and Mitigation Alaa Abd-Elsayed, MD, MPH	Technical Accuracy of O-Arm Frameless DBS without Fiducial-Markers Tommaso Tufo, MD, PhD	Burst Spinal Cord Stimulation: Pooled Analysis of Real-World Evidence and Outcomes Data Krishnan Chakravarthy, MD, PhD
17:50 - 18:00	Stride Length on Unaffected Side and Modified Ashworth Scale are Tools to Assess Lower Limb Spasticity Treated with Peripheral Neurotomy Enhanced by Peripheral Magnetic Stimulation Juan Carlos Mario Andreani, MD	X-linked Dystonia-parkinsonism is a Rare Genetic Endemic Movement Disorder in the Philippines. Bilateral DDBS of the Internal Globus Pallidum in a Cohort Study is Presented Dirk Rasche, MD, PhD	Pulse Dosing of 10 KHz Paresthesia-Independent Spinal Cord Stimulation Provides Same Efficacy with Substantial Reduction of Device Recharge Time Mayank Gupta, MD
18:00-18:10	Large Scale, Real-World Safety Analysis of DRG Stimulation Timothy R. Deer, MD	Subthalamic Nucleus Deep Brain Stimulation Modulates Evoked Resonant Neural Activity Nicholas Sinclair, B.Eng(hons)	Gasserian Ganglion Stimulation in Neuropathic Facial Pain László Halász, MD
18:10-18:20	Prospective, Open Label, Pilot Study: One Year Results of 10KHz Spinal Cord Stimulation (SCS) for Neuropathic Back Pain in Non-Operated Patients: The Maiden-Back Study G. Baranidharan, FRCA, FFPMRCA	Predictive Factors for Long-term Clinical Outcomes of Deep Brain Stimulation in the Treatment of Primary Meige Syndrome Zhiqi Mao, MD, PhD	Novel Surgical Paddle Lead Placement for Spinal Cord Stimulation via a Minimal Invasive Approach: Sub-Spinous Laminectomy (SSL) Greg Bara, MD
18:20 - 18:30	Short Break		
18:30 - 19:30	International Women in Neuromodulation Reception (Level 4 Foyer)		

WEDNESDAY, 29 MAY 2019

	Pyrmont Theatre	
07:30 - 08:00	Morning Coffee and Pastries in the Exhibition Area (Hall 1)	
08:00 - 08:30	**Plenary: Conflict of Interest in Neuromodulation Panel Discussion**	
	Moderator: Stana Bojanic, MBBS, FRCS (SN) Panelists: Sudhir Diwan MD, Frank Huygen, MD, PhD, Wendy Lipworth, MBBS, PhD, Martha Morrell, MD, Richard North, MD	
08:30 - 11:30	**Plenary Session**	
	Moderators: Brian Simpson, MD, FRCS and Christophe Perruchoud, MD	
08:30 - 09:00	**Sources of Bias in Randomized Controlled Trials of Neuromodulation and Advice on Mitigation** Nathaniel Katz, MD, MS	
09:00 - 09:30	**Current Concepts and Evidence in Neuromodulation for Headache** Peter Goadsby, MD, PhD	
09:30 - 10:00	**Prospective 12 Month Outcomes of Multi-Center Trials of 10 khz Spinal Cord Stimulation in the Treatment of Arm and Neck Pain (Australian and North American Centers)** Kasra Amirdelfan, MD and Paul Verrills, MM(Pain Med), FIPP	
10:00 - 10:25	Break, Posters and Exhibits in the Exhibition Area (Hall 1)	
10:30 - 11:00	**Current State of Battery-Free Systems** Richard Weiner, MD	
11:00 -11:30	**Recommendations of the Joint INS, IoN and IMMPACT Group** Simon Thomson, MBBS, FFPMRCA and Richard North, MD	
11:30 - 12:20	Giant of Neuromodulation Awards Award recipients: **Michael Cousins, MD DSc FANZCA FFPMANZCA FAChPM(RACP) FAICD** **Richard North, MD** Presenters: Marc Russo, MBBS, FFPMANZCA and Robert M. Levy, MD, PhD	
12:20 - 14:30	Lunch, Posters and Exhibits in the Exhibition Area (Hall 1)	**Parkside Ballroom** Sponsored Lunch Symposium (no CME/CPD credit) - see page 53 (12:35 - 13:35)

	Pyrmont Theatre	Room C4.4	Room C4.5
14:30 - 16:00	**Neuromodulation for Pain: Sensing and Feedback**	**Neuromodulation for Neuro-Rehabilitation and Stroke**	**Under the Hood: Mechanisms of Action Aspects**
	Moderators: Simon Thomson, MBBS, FFPMRCA and Corey Hunter, MD, FIPP	Moderators: André Machado, MD, PhD and Julian Taylor, BSc (Hons), PhD	Moderators: Jeffrey Arle, MD, PhD and Robert D. Foreman, PhD
14:30 - 14:45	**What Should a Neuromodulation Device Measure?** Christophe Perruchoud, MD	**Neuromodulation for Neurorehabilitation of Motor Disorders for Stroke and Spinal Cord Injury: An Overview** Julian Taylor, BSc (Hons), PhD	**Beyond the Gate** Yun Guan, MD, PhD
14:45 - 15:00	**Using Wearable Sensors and Implantable Neuromodulation Devices to Measure Function** Richard Sullivan, MBChB, FFPMANZCA	**Noninvasive Brain Stimulation for Stroke** Ray-Yau Wang, PT, PhD	**Burst and High Frequency Stimulation: Mechanisms of Action** Thomas Yearwood, MD, PhD
15:00 - 15:15	**Physiological Sensing in Deep Brain Stimulation** J. Luis Lujan, MS, PhD	**Invasive Brain Stimulation for Stroke** André Machado, MD, PhD	**Role of ECAPS in Understanding Spinal Cord Stimulation Action** Robert M. Levy, MD, PhD
15:15 - 15:30	**Feedback Stimulation of the Dorsal Columns** Timothy R. Deer, MD	**Spinal Cord Stimulation for Spinal Cord Injury** Reggie Edgerton, PhD	**Microglial Modulation in Neural Stimulation** Richardo Vallejo, MD, PhD
15:30 - 15:45	**Long-term Outcomes from the Avalon Study: A Prospective Multicenter Study Evaluating Closed-Loop SCS in the Treatment of Chronic Back and Leg Pain** Marc Russo, MBBS, FFPMANZCA	**Noninvasive Brain Stimulation for Spinal Cord Injury** Mar Cortes, MD	**Deep Brain Stimulation Mechanism of Action Review** Cameron McIntyre, PhD
15:45 - 16:00	Discussion	Discussion	Discussion
16:00 - 16:30	Break, Posters and Exhibits in the Exhibition Area (Hall 1)		
16:30 - 18:20	**Oral Poster Presentations**		
	Moderators: Kaare Meier, MD, PhD and B. Todd Sitzman, MD, MPH	Moderators: Paresh Doshi MS, MCh and Hidehiro Hirabayashi, MD, PhD	Moderators: Noemi Rosenfeld, MD and Fabian Piedimonte, MD, FIPP
16:30 - 16:40	**Anatomically Placed Leads Provide Superior Pain Relief when Using a Novel, Pulsed Spinal Cord Stimulation Pattern: Results from a Prospective, Multi-Center Study** Robert M. Levy, MD, PhD	**Investigating the Effect of STN-DBS on Voice Quality** Atilla Yilmaz, MD	**Spinal Cord Stimulation Failures: Underlying Mechanisms and Clinical Outcomes** Jason E. Pope, MD, FIPP
16:40 - 16:50	**Spinal Cord Stimulation for Intractable Pain: Early Results of a Prospective, Multi-Center, Real-World Clinical Outcomes Study Show Reduced Incidence of Lead Migration and Fracture** Robert M. Levy, MD, PhD	**Does Subthalamic Nucleus Deep Brain Stimulation Effect the Static Balance at Different Frequencies?** Atilla Yilmaz, MD	**Synergistic Mechanisms of Action in a Novel, Pulsed SCS Pattern** Lawrence Poree, MD, PhD

	Pyrmont Theatre	Room C4.4	Room C4.5
16:50 - 17:00	Efficacy of Burst Spinal Cord Stimulation Neural Dosing in De-Novo Patient: Preliminary Analysis Timothy R. Deer, MD	Accuracy of Deep Brain Stimulation (DBS) Electrode Placement using O-Arm Intraoperative Computed Tomography (ICT) during Image-Guided, Frame-Based, Asleep DBS for Movement Disorders Byung-chul Son, MD, PhD	Sacral Nerve Stimulation Inhibits the MAPK/NF-KB Signaling Pathway and Promotes Treg-TH1/17 Cell Balance in TNBS-Induced Inflammation in Rats Yan Meng, PhD
17:00 - 17:10	Prospective, Randomized, Multi-National Study Results Testing a Novel, Pulsed Stimulation Pattern (PSP) in the Treatment of Chronic Low Back Pain Paul Verrills, MM(Pain Med), FIPP	Microelectrode Recording Analysis of Subthalamic-Nuclei Deep Brain Stimulation in Parkinson's — A Study of 46 PD Patients on Neuromodulation Rama Raju Venkateshwarla, PhD	Spinal Cord Stimulation Modulates Proteins in the Extracellular Matrix of the Spinal Cord of an Animal Model of Neuropathic Pain David Cedeno, PhD
17:10 - 17:20	Spinal Cord Stimulation at 10 kHz for Chronic Intractable Leg Pain: A Prospective, Multicentre Australian Study Richard Sullivan, MBChB, FFPMANZCA	Motor Evoked Potentials Recorded from Segmented DBS Leads: Relationship of Distance to the Corticospinal Tract Jay Shils, PhD, D. ABNM	Evoked Compound Action Potentials to Guide Lead Placement: A Neuromonitoring Technique—Case Series Steven Falowski, MD
17:20 - 17:30	Spinal Cord Stimulation at 10 Khz for Treatment of Chronic Head Pain John Salmon, MD	Dynamic Change of the Cutaneous Silent Period in Patients with Parkinson's Disease Eiichirou Urasaki, MD	A Platform for Machine Learning Discovery of Stable Neural Biomarkers for Closed-Loop Neuromodulation Oliver Armitage
17:30 - 17:40	A Prospective Global Registry of Real-World Outcomes using Spinal Cord Stimulation Systems for Chronic Pain Simon Thomson, MBBS, FFPMRCA	A Palm-Worn Device to Monitor Rigidity in Parkinson's Disease Thushara Perera, PhD	Spinal Cord Stimulation in Patients with Spinal Cord Injury Emil Isagulyan, MD
17:40 - 17:50	Responder Analysis of Prospective, Multicenter Trial to Evaluate Multiplexed SCS for Differential Targets in Subjects with Chronic Intractable Back Pain with or without Leg Pain Ricardo Vallejo, MD, PhD	Direct DBS: A Prospective, Multicenter, Double-Blinded Clinical Study of Directional DBS Energy Consumption And Estimated Battery Longevity for Chronic Stimulation Harrison Walker, MD	WIKISTIM.ORG UPDATE Richard North, MD
17:50 - 18:00	Treatment of Chronic Back and Leg Pain (CBLP) Patients with a Novel Miniature Wireless Spinal Cord Stimulation System Werner Ek Braunsdorf, MD	Two-Year Follow-up of a Prospective, Double-Blinded, Multi-Center Randomized Controlled Trial Evaluating DBS with a New Multiple-Source, Constant-Current Rechargeable System for Parkinson's Disease (Intrepid) André Machado, MD, PhD	Electropsychophysical Characterization of High-kHz Epidural Spinal Cord Stimulation Paul Verrills, MM(Pain Med), FIPP
18:00 - 18:10	Is there a Relationship between Location of SCS and Outcomes for Chronic Pain? Image-based Analysis Adnan Al-Kaisy, FRCA, FFPMRCA	Direct DBS: A Prospective, Multi-Center, Double-Blinded Clinical Study of Directional Deep Brain Stimulation -- Inter-Visit Impedances and their Possible Effects on Delivered Therapeutic Current Harrison Walker, MD	Customization of Neural Dose: Real-World Data Demonstrating the Relationship between Frequency, Pulse-Width, and Amplitude in Achieving Sub-Perception SCS Pain Relief Simon Thomson, MBBS, FFPMRCA
18:10 - 18:20	Dorsal Root Ganglion Stimulation under Real Life Conditions — A Single-Center Case Series of 115 Patients Philipp J. Slotty, MD	Frameless Robot-assisted GPi Deep Brain Stimulation for Parkinson's Disease Heather Pinckard-Dover, MD	Programming Strategies in Post-Implant Clinical Sessions: Usefulness of Computer Model to Predict the Paresthesia Area Displacement in the Transversal Direction Jose L. Dura, M. Eng.

THURSDAY, 30 MAY 2019

	Pyrmont Theatre	Room C4.4	Room C4.5	Room C2.6
07:30 - 08:00	Morning Coffee and Pastries in the Pyrmont Theatre Foyer			
08:00 - 10:00	**New Targets, New Diseases**	**Advances in Neuromodulation for Refractory Epilepsy**	**Neuromodulation for Pelvic Organ Motility Disorders**	**Neuromodulation in Asia Part 1**
	Moderators: Frank Huygen, MD, PhD and Vivek Mehta, FRCA, FFPMRCA	Moderators: Arthur Cukiert, MD, PhD and Guoming Luan, MD, PhD	Moderators: Sean L. Francis, MD, FPMRS and Stefan De Wachter, MD, PhD	Moderator: Chi Wai Cheung, MBBS, MD
08:00 - 08:15	**The Case for Cordotomy vs. Neuromodulation for Cancer Pain** Pro-Cordotomy: Ido Strauss, MD, PhD Con-Cordotomy: Peter Teddy, FRACS, FFPMANZCA	**Neurobiology of Neuromodulation of Epilepsy** Ana Velasco, MD, PhD	**Sacral Neuromodulation for the Treatment of Urinary Bladder Dysfunction: Mechanism of Action and Future Directions** Bertil Blok, MD, PhD	**Welcome (08:00 - 08:10)** Marc Russo, MBBS, FFPMANZCA **Neuromodulation for Epilepsy (08:10 - 08:30)** Tianfu Li, MD, PhD
08:15 - 08:30	**Sphenopalatine Ganglion Stimulation Therapy: Procedural Challenges** Kavita Poply, FRCA, FFPMRCA	**Neuro-Anatomy Relevant to Neuromodulation for Epilepsy** Abbas Sadikot, MD, PhD	**Indications and Clinical Results of Pelvic Floor Neuromodulation** James Whiteside, MD, MA	
08:30 - 08:45	**Treatment of Refractory Chronic Migraine: Results from a Feasibility Study** Adnan Al-Kaisy, FRCA, FFPMRCA	**Responsive Vagal Nerve Stimulation** Arthur Cukiert, MD, PhD	**Standardization in Sacral Neuromodulation Technique** Stefan De Wachter, MD, PhD	**Neuromodulation in Minimally Conscious State (08:30 - 08:50)** Wei Wang, MD, PhD
08:45 - 09:00	**The Approaches in Peripheral Nerve Stimulation of Brachial Plexus** Guiliano De Carolis, MD	**Responsive Deep Brain Stimulation** Martha Morrell, MD	**Complications Associated with Sacral Neuromodulation** Sean L. Francis, MD, FPMRS	**Neuromodulation for Psychiatric Disorders (08:50 - 09:10)** Bomin Sun, MD, PhD
09:00 - 09:15	**Mechanisms of Action of Dorsal Root Ganglion Stimulation for Pain** Corey Hunter, MD, FIPP	**Hippocampal Deep Brain Stimulation** Arthur Cukiert, MD, PhD	**Sacral Neuromodulation for Pelvic Pain and Pelvic Organ Dysfunction** Thierry Vancaillie, FRANZCOG, FFPMANZCA	**The Present and Future Status of Neuromodulation Treatment in Taiwan (09:10 - 09:30)** Yeong-Ray Wen, MD, PhD
09:15 - 09:30	**State of the Art Review of Dorsal Root Ganglion Stimulation** Adnan Al-Kaisy, FRCA, FFPMRCA	**Targeting in Deep Brain Stimulation for Epilepsy** Kai Lehtimäki, MD, PhD	**Updates in Percutaneous Tibial Neuromodulation** Kenneth Peters, MD	
09:30 - 09:45	**New Indications for Dorsal Root Ganglion Stimulation** Frank Huygen, MD, PhD	**Experience of Deep Brain Stimulation for Epilepsy** Guoming Luan, MD, PhD	**Pudendal Stimulation** Katleen Jottard, MD	Discussion (09:30 - 09:55)
09:45 - 10:00	Discussion	Discussion	Panel Discussion - Stage 1 vs PNE	
10:00 - 10:25	Break and Exhibits in the Pyrmont Theatre Foyer			

Mandarin—English, English—Mandarin (Simultaneous Translation)

	Pyrmont Theatre	Room C4.4	Room C4.5	Room C2.6
10:30 - 11:20	**Oral Poster Presentations**			**Neuromodulation in Asia Part 2**
	Moderators: Konstantin V. Slavin, MD and Emil Isagulyan, MD	Moderators: Wojciech Maksymowicz, MD, PhD and Yong-Chul Kim, MD, PhD	Moderator: Philip Finch, FFARCS, FFPMANZCA and Mayank Gupta, MD	Moderators: Luan Guoming MD, PhD, Alexandre Yeo, MBBS, MMED
10:30 - 10:40	**Lateral Cord Magnetic Stimulation for Refractory Spastic Cerebral Palsy — Design of a Multicenter Double Blinded Randomized and Controlled Clinical Trial** Juan Carlos Mario Andreani, MD	**A Study on Neuromodulation for Optimizing Subthalamic-Nuclei Stimulating Effect of Varied Frequency Parameters to Enhance the Gait with Dual Tasking in Parkinson's Disease** Rama Raju Venkateshwarla, PhD	**Changes in Electrophysiological Test Results of the Somatic and Autonomic Nervous System following Sacral Neuromodulation** Stefan De Wachter, MD, PhD	**Neuromodulation for Back Pain in Hong Kong (10:30 - 10:50)** Chi Wai Cheung, MBBS, MD
10:40 - 10: 50	**Neurostimulation Therapy and Medical Cannabis: An Integrated Therapy for the Management of Chronic Neuropathic Pain** Paolo Poli, MD, PhD	**Effects of Pedunculopontine Nucleus (PPN) Deep Brain Stimulation (DBS) In Reducing Falls, Improving Gait and Postural Control in Parkinson's Disease (PD): 5-Years Follow-up** Mohammad Naushahi, LLM, PhD	**Early Evaluation of an Implanted Chronic Tibial Nerve Stimulation Device versus Percutaneous Nerve Stimulation for the Treatment of Urinary Urge Incontinence** Kenneth Peters, MD	
10:50 - 11:00	**Characterization of Electrodes for Minimally Invasive Direct Current Nerve Block** Tina Vrabec, PhD	**Supression of Periictal Psychotic Episodes during Long Term Vagus Nerve Stimulation for Drug Resistant Epilepsy** Jacint Sala-Padró	**Transcutaneous Neuromodulation of Spinal Cord to Restores Bladder and Bowel Function after Spinal Cord Injury** Parag Gad, PhD	**Combat with Neuromodulatory Therapies in Korea as a Pioneer (10:50 - 11:10)** Yong-Chul Kim, MD, PhD
11:00 - 11:10	**National Neuromodulation Registry (NNR): United Kingdom** G. Baranidharan, FRCA, FFPMRCA	**Utility of Awake Deep Brain Stimulation when Targeting Globus Pallidus Internus** Heather Pinckard-Dover, MD	**High Dose Opioid Use Associates with Failure of Spinal Cord Stimulation in 211 Patients with Failed Back Surgery Syndrome** Eva Nissen	
11:10 - 11:20	**Preliminary Investigation of a Novel Ultrahigh-Frequency Stimulation Paradigm at Spinal Cord in Patients with Intractable Back Pain and/or Leg Pain** Yeong-Ray Wen, MD, PhD	**Effectiveness of Lead-Point with Microelectrode Signal Recording in Determining Subthalamic-Nucleus Deep Brain Stimulating Electrode-Implantation in Parkinson`s Disease (MER Signal Analysis with STN-DBS in PD)** Rama Raju Venkateshwarla, PhD	**Personalised Neuromodulation: Early Characterisation of Fully Stretchable, Patient-Specific Electrode Arrays for Chronic Neuron-Electrode Interfacing** Conor Keogh, MB BCh BAO	**Current State and Future Trend of Deep Brain Stimulation Therapy in Japan (11:10 - 11:30)** Hidehiro Hirabayashi, MD, PhD
11:20 - 11:30	Short Break to Change Halls			

Mandarin—English, English—Mandarin (Simultaneous Translation)

	Pyrmont Theatre	Room C2.6
11:30 - 13:20	**Closing Plenary Session: The Future?** Moderators: Marc Russo, MBBS, FFPMANZCA and Robert M. Levy, MD, PhD	Salvage of Spinal Cord Stimulator in Chronic Pain Alexandre Yeo, MBBS, MMED (11:30 - 11:50)
11:30 - 12:00	**Vagus Nerve Implants to Optimize Vagal Signals and Function - Bioelectronic Medicine as a Future Standard of Care** Theodoros Zanos, PhD, MSc	Discussion (12:50 - 12:15)
12:00 - 12:30	**Big Data Use in Neuromodulation** Richard Kuntz, MD, MSc	
12:30 - 13:00	**Transcranial Stimulation for a Smarter You** Jeffrey Arle, MD, PhD	
13:00 - 13:30	**Cyber Security in Neuromodulation** Vijay Varadharajan, FIEE, FIEAust	
13:30	Congress Adjourns	

Note: The scientific program in the book is subject to change. For the latest, most updated version, please check the online interactive program (https://ins-congress.com/2019/program-(2)/program) or the Congress mobile App (see the advert in the inside front cover of this book.)

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The scientific committee of the 14th World Congress of the INS would like to thank our esteemed faculty.

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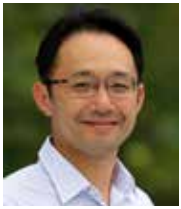

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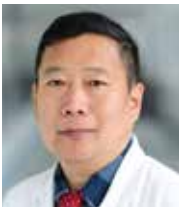

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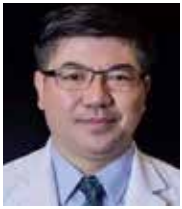

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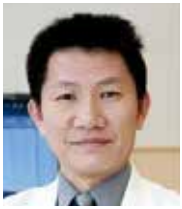

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*Not included in the Scientific Program. CME credit is unavailable for this activity.

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ORAL PRESENTATIONS

All oral presenters must check in with the technician at the Speakers' Ready Room, located in Room C2.1

Please check the Mobile App or Interactive Online Program for any updates to your presentation date, time, and location.

PLEASE NOTE:
In compliance with CME requirements all speakers are requested to display a slide disclosing conflicts of interest at the beginning of their presentation for at least 30 seconds. If you have nothing to disclose, this slide must be included indicating "nothing to disclose".

DATA PRESENTATION

If using a PowerPoint presentation (or any other PC based application), please note you need to bring it on USB Memory stick and load it on one of the congress computers in the Speakers' Ready Room at least 2 hours before the start of the session.

If combining video films with PowerPoint, please make sure to check it in the session hall where your lecture is taking place during a coffee or lunch break prior to your session, at least 30 minutes before the start of the session - even after checking it in the Speakers' Ready Room.

Alternatively, you may supply your own laptop computer. In such a case, please confirm that it has an HDMI socket for external signal, and come to check it first in the Speakers' Ready Room as soon as you arrive, and again later on in the session hall where your lecture is taking place during the coffee or lunch break prior to your session, at least 30 minutes before the start of the session.

Please note that the congress computers in the session halls are being supplied with Office 2016.

IMPORTANT NOTE FOR APPLE MACINTOSH USERS

- In order to use MAC presentations on a PC compatible computer please note that you need to prepare it according to the instructions below, before bringing it to the Speakers' Ready Room: C2.1.
- Use a common font, such as Arial, Times New Roman, Verdana etc. (special fonts might be changed to a default font on a PowerPoint based PC).
- Insert pictures as JPG files (and not TIF, PNG or PICT - these images will not be visible on a PowerPoint based PC).
- Alternatively, you may use your own Apple Macintosh laptop computer. In such a case, please confirm you provide it with an HDMI adaptor for external signal, advise the operators in the Speakers' Ready Room about it as soon as you arrive, and later on test it in the session hall where your lecture is taking place during the coffee or lunch break prior to your session, at least 30 minutes before the start of the session.

SPEAKERS' READY ROOM HOURS

Monday, 27 May	07:00 - 19:00
Tuesday, 28 May	07:00 - 19:00
Wednesday, 29 May	07:00 - 18:30
Thursday, 30 May	07:30 - 13:30

Speakers involved in Saturday, 25 May and Sunday, 26 May Pre-Conference sessions should upload their presentations in the Parkside Ballroom at the AV Control desk on Saturday (from 08:00) or on Sunday (from 07:00), preferably during the breaks.

ORAL AND POSTER PRESENTATION SESSIONS

The top abstracts chosen by the Scientific Committee will be presented and discussed during the Oral Presentations Sessions.
These moderated Oral Presentation sessions will take place as follows:

MONDAY, 27 MAY

11:30 – 12:20 Five Best Abstracts

Long-Term Results from The Avalon Study – Feedback-Controlled SCS Using Evoked Compound Action Potentials
C. Brooker, M. Russo, L. Holford, N. Taylor, R. Sullivan, N. Hesam Shariati, J. Parker

A Comparison of Behavior and Report of Gene Expression Modulation of Waveform-Dependent Spinal Cord Stimulation in a Rat Model of Neuropathic Pain
D. Cedeno, A. Gupta, C. Kelley, A. Vallejo, J. Rink, J. Williams, C. Cass, R. Benyamin, R. Vallejo

Modulation of the Neuroglia Interaction using Differential Target Multiplexed Spinal Cord Stimulation in an Animal Model of Neuropathic Pain
R. Vallejo, C. Kelley, A. Gupta, W. Smith, A. Vallejo, C. Cass, J. Williams, R. Benyamin, D. Cedeno

Opioid Dose Reduction after Spinal Cord Stimulation
S. Lad, L. Charalambous, M. Kiyani, S. Adil, C. Spears, Z. Yang, H.J. Lee, B. Liu, P. Pagadala, B. Parente,

Personalized, Closed-Loop Deep Stimulation for Refractory Chronic Pain
P. Shirvalkar, G. Chin, H. Dawes, C. De Hemptinne, P. Starr, E. Chang

MONDAY, 27 MAY

16:30 – 18:20 Topics: Neuromodulation for Chronic Pain, Brain Stimulation for Psychiatric and Movement Disorders

TUESDAY, 28 MAY

16:30 – 18:20 Topics: Intrathecal Therapy and Neurostimulation for Chronic Pain, Brain Stimulation for Movement Disorders, Neurostimulation for Gastrointestinal Disorders

WEDNESDAY, 29 MAY

16:30 – 18:20 Topics: Neuromodulation for Chronic Pain, Brain Stimulation for Movement Disorders, Neuromodulation Mechanisms of Action and Basic Science

THURSDAY, 30 MAY

10:30 – 11:20 Topics: Neuromodulation for Chronic Pain, Brain Stimulation for Epilepsy and Movement Disorders, Neuromodulation for Pelvic Organ Motility Disorders and Chronic Pain

POSTER PRESENTATION SCHEDULE

All posters will be on display between 07:30 – 16:30 from Monday, 27 May until Wednesday, 29 May in the Poster and Exhibition Area in Hall 1.

HIGHLIGHT DAYS

On a specific highlighted topic day, abstract authors of those topics are encouraged to stand near their poster board during breaks and lunch times in order to answer any questions delegates may have.
The list of the highlighted posters per day is available at the poster help desk.

CME-CPD ACCREDITATION

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Kenes is committed to being a valuable and knowledgeable partner in the design and delivery of educationally strong, independent, transparent, and effective CME/CPD programmes. Kenes is a proud member of the Good CME Practice Group (gCMEp), a member organisation contributing to improving health outcomes by:

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EDUCATIONAL OBJECTIVES

See Congress objectives (page 6)

TARGET AUDIENCE

INS 2019 is appropriate for all physicians involved in the care for patients in pain, acute and chronic. This includes, but is not limited to, general practitioners, physiatrists, anesthesiologists, neurologists, psychiatrists, radiologists, and surgeons. The program will also be appropriate for non-physician healthcare workers including nurses, physician assistants, psychologists, physical therapists and occupational therapists, as well as third-party payors of health-care and regulatory affairs professionals.

ACCREDITATION STATEMENT AND CREDIT DESIGNATION

EUROPEAN ACCREDITATION COUNCIL FOR CONTINUING MEDICAL EDUCATION (UEMS/EACCME)

The International Neuromodulation Society's 14th World Congress is accredited by the European Accreditation Council for Continuing Medical Education (EACCME) to provide the following CME activity for medical specialists. The EACCME is an institution of the European Union of Medical Specialists (UEMS): www.uems.net.

The International Neuromodulation Society's 14th World Congress is designated for a maximum of, or up to, 36 European external CME credits. Each medical specialist should claim only those hours of credit that he/she actually spent in the educational activity.

AMERICAN MEDICAL ASSOCIATION (AMA)

Through an agreement between the European Union of Medical Specialists and the American Medical Association, physicians may convert EACCME credits to an equivalent number of *AMA PRA Category 1 Credits*™. Information on the process to convert EACCME credit to AMA credit can be found at www.ama-assn.org/go/internationalcme.

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Live educational activities, occurring outside of Canada, recognized by the UEMS-EACCME for ECMEC credits are deemed to be Accredited Group Learning Activities (Section 1) as defined by the Maintenance of Certification Program of The Royal College of Physicians and Surgeons of Canada. For more information, visit: www.royalcollege.ca.

CREDIT BREAKDOWN

Each participant should claim only those hours of credit that he/she actually spent in the educational activity.

Day	Maximum Credits
Saturday, 25 May, 2019	4
Sunday, 26 May, 2019*	8
Monday, 27 May, 2019	7
Tuesday, 28 May, 2019	6
Wednesday, 29 May, 2019	7
Thursday, 30 May, 2019	4
Total Credits	**36**

**Credits are available only for Cadaver Workshop (8 ECMECs) and Public Educational Event (4 ECMECs) on this day.*

TO RECEIVE YOUR CME/CPD CERTIFICATE

The CME/CPD certificate will be available after completing the online evaluation and credit claiming procedure. The process takes about 5 minutes. We thank you for your feedback as it is an important part of CME/CPD accreditation and helps improve future educational offerings.

Before June 27, 2019:

1. Access the online system via any of the following
   - Visit the following link: https://www.surveymonkey.com/r/INS2019Evaluation
   - Please note that web browsers Mozilla Firefox 2.X or higher, or Google Chrome are recommended
   - Visit the CME/CPD Accreditation page on the event website
   - Follow the link in the email sent at the end of the event
2. Complete the anonymous online evaluation
3. Complete the credit claim form and submit
4. The CME/CPD certificate will be available for download and/or print for your personal records

DISCLOSURE AND RESOLUTION OF PERSONAL CONFLICTS OF INTEREST

In accordance with CME/CPD accreditation criteria and standards for commercial support to ensure balance, independence, objectivity, and scientific rigor, those in control of the educational content must disclose potential or actual conflicts of interest. Disclosure information is evaluated and conflicts of interest resolved. Disclosure is made to participants prior to the activity. Participants will be asked on the evaluation to assess the objectivity and independence of the event.

- Disclosure information is available on the event website and also posted on the notice board in the registration area.

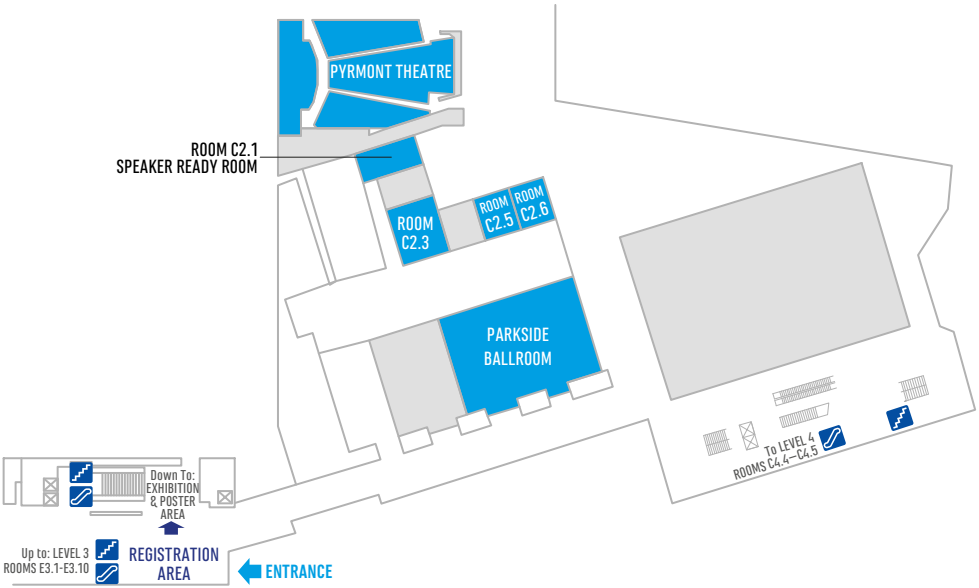
INDUSTRY SUPPORT DISCLOSURE

This event is supported, in part, by funding from Industry. All support is managed in strict accordance with CME/CPD accreditation criteria and standards for commercial support. Appropriate acknowledgement of all supporting organisations is made in the programme guide, on the event website, and with signage during the event.

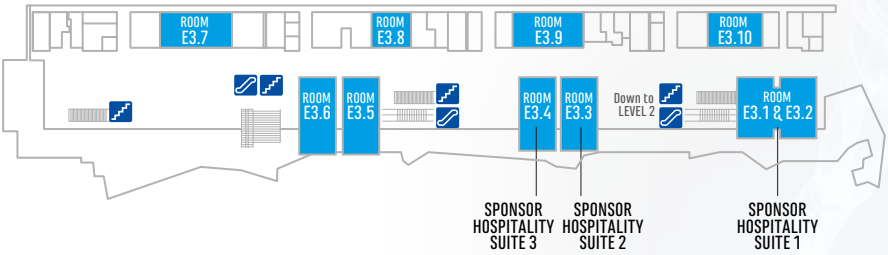
- A list of all industry supporters is available in the Industry Support and Exhibition section at the back of the programme guide.

CONGRESS FLOOR PLANS

LEVEL 2 (ENTRY LEVEL)



LEVEL 3 (EXHIBITION CENTRE)



LEVEL 4 (CONVENTION CENTRE)

NETWORKING EVENTS

INS CONGRESS OPENING RECEPTION

SUNDAY, 26 MAY | 18:00 - 19:30

Location: Exhibition Area

All INS delegates are invited to the Opening Reception, which will be held in the Exhibition Area. A wonderful opportunity to meet, network and engage with colleagues and fellow delegates.

YOUNG NEUROMODULATORS RECEPTION

MONDAY, 27 MAY | 18:30 - 19:30

Location: Level 4 Foyer

Join us to learn more about the Young Neuromodulator Committee's initiatives, meet the members who are driving their activities, and network with fellow delegates, and prospective mentors and mentees.

Pre-registration is not required. All are welcome to attend.

INTERNATIONAL WOMEN IN NEUROMODULATION RECEPTION

TUESDAY, 28 MAY | 18:30 - 19:30

Location: Level 4 Foyer

Join us for the International Women in Neuromodulation Reception. This will be a great opportunity to learn about the committee's activities, and network with new colleagues, mentors, and mentees from all around the world.

Pre-registration is not required. All are welcome to attend.

ins
International Neuromodulation Society

Neuromodulation
Leading a Global Medical Revolution

INS 14TH WORLD CONGRESS

PRE-CONFERENCE INNOVATIONS IN NEUROMODULATION*

RECOGNITION, ACKNOWLEDGEMENTS AND INDUSTRY SUPPORT

* Not included in the Scientific Program. CME credit is unavailable for this activity

INNOVATIONS IN NEUROMODULATION*

SUNDAY, 26 MAY, 2019 PARKSIDE BALLROOM

The focus on **Disruptive Innovation: The Driving Force of Progress in Neuromodulation**

allows us to revolutionize the field and create leaps of progress rather than incremental improvements. The last decade has been ripe with multiple examples of disruptive innovation in the neuromodulation arena, including "out-of-box" stimulation targets, frequencies, paradigms and principles.

To fit in with the day's theme, we will have lectures from innovators and entrepreneurs on technology disruption, interspersed with emerging company panels that will highlight how each company's technology or approach has disrupted the status quo and what this means for the company and the neuromodulation space. This will provide engaging sessions for attendees of all backgrounds who are interested in the neuromodulation space and where technology and therapies are going.

We have developed the program with an aim of achieving several objectives:

- Identify and discuss the data that needs to be collected by commercializing companies to ensure it has utility for future approval and reimbursement applications.
- Learn about the process by which innovations occur, become funded, are approved, receive reimbursement and reach the marketplace.
- Describe the process of establishing and protecting intellectual property.
- Define the regulatory process by which approvals are obtained in Australia, Europe and in the U.S., respectively, and ultimately earn full reimbursement.
- Learn about what public scientific initiatives are available with which to partner.
- Find out about current and future investment strategies and challenges in the device market — in Australia, Europe and the US.
- Discover emerging companies and the science behind their innovative therapies.
- Network with the leaders in innovation, investment, basic science and clinical practice in the neuromodulation space.

Dr. Konstantin V. Slavin and Dr. Marc Russo

Co-Chairs, INS Innovations in Neuromodulation

* Not included in the Scientific Program. CME credit is unavailable for this activity

DISRUPTIVE INNOVATION: THE DRIVING FORCE OF PROGRESS IN NEUROMODULATION

Chairs: Konstantin Slavin, MD; Marc Russo, MBBS, FFPMANZCA

Time	PROGRAM	
07:30-08:00	Breakfast	
08:00-08:10	Welcome and Introduction	Konstantin Slavin, MD; Marc Russo, MBBS, FFPMANZCA
08:10-08:50	Keynote Presentation #1: Rediscovery of an Often Ignored Physiologic Signal: The Potential Source of Neuromodulation Innovation and Inspiration into the Next Century	Josh Makower, MD, General Partner, NEA
08:50-10:30	**Section 1: Early Stage Companies**	
08:50-09:06	The Synergia Medical Perspective	Attila Borbáth, CEO, Co-founder, Synergia Medical
09:06-09:22	The GTX Medical Perspective	Sjaak Deckers, PhD, CEO, GTX medical BV
09:22-09:38	The Aldans Health Perspective	Song-Song Liao, Founder / Interim CEO, Aldans Health
09:38-09:54	The Thermaquil Perspective	Stephen R. Popielarski, PhD, CEO, Thermaquil
09:54-10:10	Cala Health and the Future of Prescription Non-Invasive Neuromodulation	Samuel Hamner, PhD, Director of Product Innovation, Cala Health
10:10-10:30	Panel Discussion	
10:30-10:50	**Networking Break**	
10:50-11:30	Keynote Presentation #2: Bioelectronic Medicine as a Disruptive Technology	Renee St. Amant, PhD, Innovator of the Year, Arm Ltd
11:30-13:00	**Section 2: Intermediate Stage Companies**	
11:30-11:50	The Challenges of Disruption in Neuromodulation for CLBP: Addressing Cause vs. Symptoms	Jason Hannon, CEO, Mainstay
11:50-12:10	The Nalu Perspective on Increasing Patient Acceptance of the Therapy	Jonathan Ruais, CCO, Nalu
12:10-12:30	How to Repurpose your Disruption into Other Potential Fields and Applications?	John Parker, PhD, Founder/CEO, Saluda
12:30-12:50	How to Re-energize a Field with Multiple Failed Trials: The Occipital Challenge?	Chad Andresen, VP of Marketing, StimRelieve
12:50-13:00	Panel Discussion	

13:00-13:30	Keynote Presentation #3: Turning Neuromodulation on its Head: Fresh Perspectives on Interacting with the Nervous System	David Putrino, PhD, Mt. Sinai
13:30-14:30	**Lunch**	
14:30-15:00	Keynote Presentation #4: Disruptive Innovation in Neuromodulation: What Can we Learn from Social Media Disrupting our Communication Style?	Georgios Matis, MD, PhD, Cologne
15:00-16:30	**Section 3: Advanced Stage Companies**	
15:00-15:20	The Abbott Perspective: How to Spot the Truly Disruptive Therapy	Keith Boettiger, Abbott
15:20-15:40	The Medtronic Perspective: Advice to Startups on How to Pitch Right, and What are Big Companies Looking For?	Marshall Stanton, MD, Medtronic
15:40-16:00	The Nuvectra Perspective: How to Decide if a Market is Saturated or Ripe for Growth - Evaluating the Opportunity	Paul Hanchin, Nuvectra
16:00-16:20	The StimWave Perspective: Coming from a Clean Slate - The Benefit of Externally Evaluating a Field	Laura Perryman, Stimwave
16:20-16:40	The Boston Scientific Perspective: When and How to Disrupt from Internal Research and Development	Maulik Nanavaty, PhD, Boston Scientific
16:40-16:50	Panel Discussion	
16:50-17:20	Keynote Presentation #5: Disruptive Innovation in Neuromodulation: Tips and Tricks in Determining Newsworthiness of Innovations	James Cavuoto, Editor/Publisher, Neurotech Reports
17:20-18:00	**Wrap-up / Networking Discussion**	
18:00-19:30	**INS Congress Opening Reception in the Exhibition Area (Hall 1) - Everyone is welcome to attend**	

EARLY STAGE COMPANIES

ALDANS BIOTECH | BEIJING, CHINA | WWW.ANTISI.COM

Beijing Aldans Biotech Co., Ltd. is a startup that collaborates with prominent scientists from multiple research institutes in China, Canada and the US. The ANTIS DMS Stimulator Pillow is based on non-invasive neuromodulation technology that enhances the function of the hippocampus and promotes adult hippocampal neurogenesis. It is based on deep brain reachable low field gamma rhythmic magnetic stimulation (DMS) to act deeply in the brain. The result is not just to relieve the symptoms but to tackle the pathological changes caused by chronic stress and traumatic brain injury (TBI).

CALA HEALTH | CALIFORNIA, USA | WWW.CALAHEALTH.COM

Cala Health is a bioelectronic medicine company transforming the standard of care for chronic disease. The company's wearable neuromodulation therapies merge innovations in neuroscience and technology to deliver individualized peripheral nerve stimulation. The first indication for Cala Health's wearable therapy is Essential Tremor, a disease experienced by more than seven million people and characterized by severe hand tremors. New therapies are under development in neurology, cardiology and psychiatry. The company is headquartered in the San Francisco Bay Area and backed by leading investors in both healthcare and technology. For more information, please visit www.calahealth.com.

Cala Trio™ is a wrist-worn, non-invasive nerve stimulator for transient relief of hand tremor in adults with essential tremor. The device provides individualized stimulation using on-board sensors to measure the patient's tremor. With wireless connectivity, the device can track usage and tremor over time.

GTX MEDICAL | EINDHOVEN, THE NETHERLANDS | WWW.GTXMEDICAL.COM

GTX Medical is a young medical device company developing a new therapy to make paralyzed people walk again, using a combination of Targeted Epidural Spinal Stimulation (TESS) and intense physical therapy. GTX medical is in product development and is also supporting the team of Prof Courtine in Lausanne to conduct a first clinical feasibility study of this therapy, STIMO, with 7 chronic patients included until Dec 2018. GTX Medical is a spin-out of EPFL, the technical university of Lausanne, Switzerland, and is based in Eindhoven, the Netherlands, and Lausanne.

GTX is developing a closed-loop implantable spinal cord stimulation system with real time motion feedback, featuring a new paddle lead for targeted stimulation of specific nerve roots and a unique Implantable Neuro Stimulator (INS) designed for locomotion, synchronizing stimulation with the walking of paralyzed patients. In combination with intensive physical therapy using a 3D overground body weight support system, the product enables a new therapy, TESS.

STIMRELIEVE | FLORIDA, USA | WWW.STIMRELIEVE.COM

StimRelieve designs and develops micro-sized wirelessly-powered stimulators and external power transmitters uniquely geared toward the cranio-facial region. StimRelieve is in the process of a 50-patient, randomized clinical trial to gain FDA approval to treat CranioFacial pain. Furthermore, StimRelieve is pursuing new clinical studies for targeting the peripheral nerves of the craniofacial region to treat migraines, and cluster headaches.

Since the StimRelieve implants are 35x smaller than the smallest IPG, patients don't need to undergo surgery for a bulky battery and deal with tunneling down the neck and into the chest, abdomen, buttock or flank to place the battery. Instead of an implanted battery, patients receive 1 or 2 lightweight, effortless wearables that provide power to the implanted receivers and do not interrupt daily life. These new products empower patients to control their CranioFacial therapy wirelessly via iPhone, iPod, or Apple Watch.

SYNERGIA MEDICAL | MONT-SAINT-GUIBERT, BELGIUM | WWW.SYNERGIA-MEDICAL.COM

Synergia Medical is a pioneer in opto-electronics in neurostimulation. Its technology breakthrough is based on using optical fibres instead of the traditional electrical wires for transporting energy pulses to a target tissue, and using non-metallic casings instead of titanium casings. The advantages of these paradigm shifts are numerous.

The technology platform is intended to be safe to use in MRI for full body-scans. No feedthroughs are required, and the casing enclosing the electronics can therefore easily be fully sealed from the external environment. The use of non-metallic casing also enables biomarkers sensing and optical communication, which is safer and faster than conventional communication means.

The first device based on this technology is intended to be a next-generation, small-size implantable vagus nerve neurostimulator for use in patients with drug-resistant epilepsy.

This condition affects one third of epileptics globally. Vagus nerve stimulation can reduce both frequency and intensity of the seizures, increasing considerably the patient's quality of life.

Further developments will increase the indications for the technology beyond epilepsy. There is medical evidence to suggest that conditions such as depression, heart failure, stroke, tinnitus and certain inflammatory diseases may also benefit from vagus nerve stimulation. Future directions for application may extend to stimulation of the hypoglossal nerve to provide relief for patients with obstructive sleep apnoea.

THERMAQUIL | PENNSYLVANIA, USA | WWW.THERMAQUIL.COM

Thermaquil co-founder Professor Changfeng Tai (University of Pittsburgh) discovered multiple novel biological mechanisms to block nerve conduction. Thermaquil is developing nerve-block devices based on these insights that have minimal risk of tolerance or addiction and that truly block — not just modulate — pain signals. Thermaquil's two platforms are based on distinct mechanisms. One platform will use gentle warm and cool temperatures to allow patients to fine-tune nerve conduction, essentially creating a virtual filter across the nerve, while the other platform uses a novel electric signal to block nerves. Our goal is to provide clinicians with patient-controlled nerve block devices that can be easily implanted to provide durable, titratable analgesia for acute and chronic indications.

INTERMEDIATE AND ADVANCED STAGE COMPANIES

Please refer to the company profiles in the Exhibition Section (pages 58-65)

ABBOTT

BOSTON SCIENTIFIC

MAINSTAY MEDICAL

MEDTRONIC

NALU MEDICAL

NUVECTRA

SALUDA MEDICAL

STIMWAVE

INDUSTRY SUPPORTED SYMPOSIA

MONDAY, 27 MAY, 2019

12:35 - 13:35 | PARKSIDE BALLROOM

LUNCH SYMPOSIUM* IS ORGANIZED AND SUPPORTED BY ***Boston Scientific***

TUESDAY, 28 MAY, 2019

12:30 - 13:30 | PARKSIDE BALLROOM

LUNCH SYMPOSIUM* IS ORGANIZED AND SUPPORTED BY ***Abbott***

WEDNESDAY, 29 MAY 2019

12:35 - 13:35 | PARKSIDE BALLROOM

LUNCH SYMPOSIUM* IS ORGANIZED AND SUPPORTED BY ***Stimwave***

* Not included in the Scientific Program. CME credit is unavailable for this activity.

ACKNOWLEDGEMENTS

The 14th World Congress of the International Neuromodulation Society would like to express its gratitude and acknowledge the following companies and organizations for their generous support.

PLATINUM LEVEL SUPPORTERS

Abbott

Boston Scientific

Stimwave

BRONZE LEVEL SUPPORTERS

Mainstay Medical

Medtronic

Nuvectra

Saluda Medical

GENERAL LEVEL

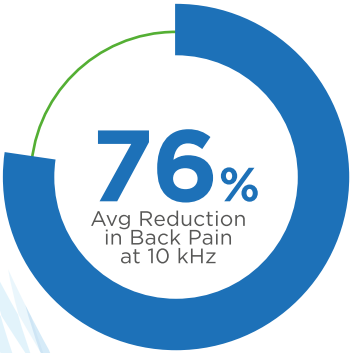
Bioness

Supported by the

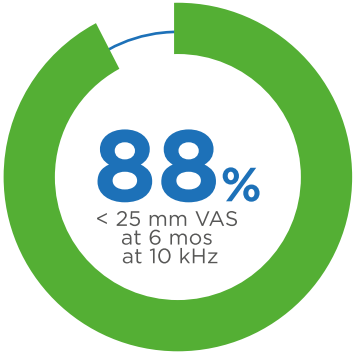
NSW GOVERNMENT

Wireless Pain Relief®

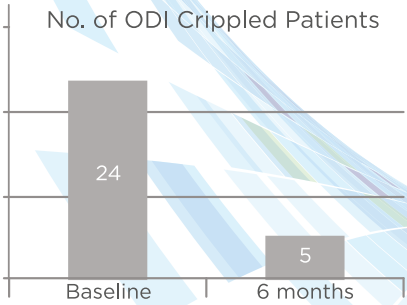
with Evidence Based Medicine



Effective Pain Relief[1]



Patients in Remission[1]



Quality of Life[1]

The Most Versatile Waveform Options

[1]Wireless high frequency spinal cord stimulation (10 kHz) compared to multi-waveform low frequency spinal cord stimulation in the management of chronic pain in failed back surgery syndrome subjects: Preliminary results of a multicenter, prospective, randomized controlled study, Bolash et al. March 2019, Pain medicine. Freedom SCS is CE Marked and TGA approved for Frequencies from 5 Hz to 10,000 Hz *CAUTION – Investigational device. Limited by Federal (or United States) law to investigational use. Pulse Rate Capabilities above 1,500 Hz to 10,000 Hz are limited by Federal (or United States) to Investigational Use. Indications for Use. The Freedom System is intended as the sole mitigating agent, or as an adjunct to other modes of therapy used in a multidisciplinary approach for chronic, intractable pain of the trunk and/or lower limbs, including unilateral or bilateral pain. The Freedom System is contraindicated for patients who: are unable to operate the Freedom System, are poor surgical risks, are pregnant, have an occupational exposure to high non-ionizing radiation, are implanted with cardiac system, or diathermy. Refer to the Instructions for Use provided with the Freedom SCS System or Stimwave.com for potential adverse effects, warnings, and precautions prior to using this product. Rx Only. Caution: Federal law (USA) restricts these devices to sale by or on the order of a physician. Wireless Pain Relief® is a registered trademark of Stimwave. 30-00909-1

LIST OF EXHIBITORS

Company name	booth number
Abbott	2
Advanz	30
Algotec	14
Avanos	11
Bioness	5
Boston Scientific	1
Heraeus	9
INS, NSANZ, NANS and other INS Chapters	34
Karuna Labs	31
LifeHealthcare	17
National Surgical & PINS	37
Mainstay Medical	10
Medilink	28
Medtronic	3, 39, 42, 43, 44
Nalu Medical	29
National Manufacturing Co.	8
Nevro	3A
Nimbus Concepts	32
Nuvectra	12
Saluda Medical	19
Stimwave	4
Velentium	13

EXHIBITION MAP

SUPPORTER AND EXHIBITOR PROFILES

ABBOTT

PLATINUM LEVEL SUPPORTER

Austin, Texas
USA
Booth #: 02
https://www.neuromodulation.abbott
Abbott is a global healthcare leader that helps people live more fully at all stages of life. Our portfolio of life-changing technologies spans the spectrum of healthcare, with leading businesses and products in diagnostics, medical devices, nutritionals and branded generic medicines. Our 103,000 colleagues serve people in more than 160 countries. Connect with us at www.abbott.com, on LinkedIn at www.linkedin.com/company/abbott-/, on Facebook at www.facebook.com/Abbott and on Twitter @AbbottNews and @AbbottGlobal.

ADVANZ PHARMA

Level 9, 76 Berry Street
North Sydney, New South Wales
Australia
Booth #: 30
http://www.bnmgroup.com/
ADVANZ PHARMA is global pharmaceutical company which aims to be an organisation that looks to help shape, innovate and grow within the global specialty off-patent sector. We are experienced in supplying more than 200 medicine in over 90 countries. Advanz Pharma is listed on the TSX stock exchange and is headquartered in Ontario, Canada.

ALGOTEC RESEARCH & DEVELOPMENT LIMITED

Basepoint Business Centre, Bridge Road
Haywards Heath, West Sussex
United Kingdom
Booth #: 14
http://www.algotec-ltd.com
Algotec Research & Development is a manufacturer of medical devices, with over 18 years experience in the field of neuromodulation. Our focus is on less invasive, safe and reliable, neurostimulation for the symptomatic relief and management of chronic peripheral neuropathic pain. Our NeuroStimulator PENS therapy® II aims to improve the quality of patient care and increase accessibility to the benefits of neuromodulation. It is a clinically proven stimulation paradigm to reduce chronic neuropathic pain by selectively stimulating peripheral nerves. Algotec invests in innovative and cost-effective technologies, which enable the management of chronic peripheral neuropathic pain with improved patient outcomes.

AVANOS MEDICAL

475 Victoria Avenue
Chatswood, New South Wales
Australia
Booth #: 11
https://avanos.com

Avanos is a medical device company focused on delivering clinically superior breakthrough solutions that will help patients get back to the things that matter. We believe a difference in our products, combined with a difference in how we work, communicate and partner, can change the entire world. We are committed to creating the next generation of innovative healthcare solutions which will address our most important healthcare needs, such as reducing the use of opioids while helping patients move from surgery to recovery. We develop, manufacture and market recognized brands in more than 90 countries.

BIONESS

GENERAL LEVEL SUPPORTER

25103 Rye Canyon Loop
Valencia, California
USA
Booth #: 05
https://www.bioness.com

Bioness is the leading provider of implantable and external neuromodulation systems, robotic systems and software therapy programs that provide functional and therapeutic benefits for individuals affected by pain, central nervous system disorders and orthopedic injuries. StimRouter is an unparalleled technology that reduces pain by delivering gentle electrical pulses directly to a target peripheral nerve to disrupt pain signals before they reach the brain. StimRouter is implanted via a minimally-invasive, outpatient procedure and many users benefit from lasting pain reduction. StimRouter is approved to treat chronic pain of peripheral nerve origin anywhere in the body, excluding pain in the craniofacial region.

BOSTON SCIENTIFIC

PLATINUM LEVEL SUPPORTER

25155 Rye Canyon Loop
Valencia, California
USA
Booth #: 01
http://WaveWriter.com

Investing in innovative products, clinical initiatives, and world-class service, Boston Scientific is committed to leading the way in spinal cord stimulation, deep brain stimulation and radio frequency ablation by providing better pain relief to a broad range of patients.

HERAEUS MEDICAL COMPONENTS

5030 Centerville Road
White Bear Lake, Minnesota
USA
Booth #: 09
https://www.heraeus.com/en/hmc/heraeus_medical_components/home_medical_components.aspx
A world leader in development and manufacturing components of neuromodulation devices for the medical device industry. Heraeus Medical Components combines unmatched expertise in precious metal melting/alloying, engineering know-how, next generation design capabilities, global outsourcing and state-of-the-art precision manufacturing to deliver a wide-ranging portfolio of components, and solutions for the world's leading medical device companies. In today's increasingly competitive marketplace, outsourcing has become an essential business strategy for device manufacturers. The most successful partnerships go far beyond a simple supplier relationship, but as an integrated and natural extension of the device manufacturer's business.

INTERNATIONAL NEUROMODULATION SOCIETY, NSANZ, NANS AND OTHER INS CHAPTERS

2000 Van Ness Avenue, Suite 414
San Francisco
USA
Booth #: 34
https://www.neuromodulation.com
The International Neuromodulation Society (INS) is a non-profit group of clinicians, scientists and engineers dedicated to the scientific development and awareness of neuromodulation - the alteration of nerve activity through the delivery of electrical stimulation or chemical agents to targeted sites of the body. Founded in 1989 and based in San Francisco, CA, the INS educates and promotes the field through its biennial meetings, its peer-reviewed journal, Neuromodulation: Technology at the Neural Interface, and chapter websites. The INS has over 2,900 members worldwide and is composed of 23 regional chapters, the largest of which is the North American Neuromodulation Society.

KARUNA LABS

525 York St
San Francisco, California
USA
Booth #: 31
http://www.karunavr.com/
Karuna Labs is a software company that addresses chronic pain at the level of the brain.

LIFEHEALTHCARE

Level 8, 15 Talavera Road, North Ryde
Sydney, New South Wales
Australia
Booth #: 17
http://www.lifehealthcare.com.au
At LifeHealthcare we bring Australian and New Zealand healthcare professionals innovative medical devices by partnering with world class companies who share our vision for innovation and making a real difference to people's lives. Together with our partners all over the world, our people work closely with healthcare professionals to ensure the highest standards of patient care.

LMT SURGICAL AND NATIONAL SURGICAL

237-239 Milton Road
Milton, Queensland
Australia
Booth #: 37
https://www.lmtsurgical.com
Founded in 1996, National Surgical is proud to be an Australian-owned Company. National Surgical provides innovative medical technologies and exceptional customer service throughout Australia and New Zealand. Having had extensive experience in providing products and services to Neurosurgery and Neurology physicians previously, especially in the field of Movement Disorder Surgery, we are again excited to offer products, which not only provide alternative, but also new and innovative solutions for DBS procedures. Both LMT and National Surgical takes pride in supporting surgeons and Patients with specialty products for Spine, Neurosurgical, ENT, and Orthopaedic procedures.

MAINSTAY MEDICAL

BRONZE LEVEL SUPPORTER

77 Sir Rogerson's Quay Block C, Grand Canal Docklands
Dublin
Ireland
Booth #: 10
http://mainstay-medical.com
Mainstay Medical is a European medical device company focused on bringing to market ReActiv8®, a new implantable Restorative Neurostimulation system which targets motor control of the spine stabilizing muscles in people with disabling Chronic Mechanical Low Back Pain and who are not indicated for spine surgery.

MEDILINK

Unit 4, 7 Millennium Ct
SILVERWATER
Australia
Booth #: 28
http://www.medilinkaustralia.com
Medilink is a 100% Australian owned, Sydney based company and has been in business for over 25 years. Medilink distributes premium brand scientific instrumentation to clinical and research operations in both Australia and New Zealand. Medilink supplies and services a selection of products that support Neuroscientists through Neuro-diagnostics, Neuro-modulation, Neuro-stimulation, Neuro-imaging and Neuro-navigation. Applications include, ANT Neuro: Neuronavigation and EEG systems, Magstim Ltd: rTMS MECTA Corporation: ECT systems NIRX Corporation: Functional Near Infrared Imaging systems (fNIRS)

MEDTRONIC

BRONZE LEVEL SUPPORTER

710 Medtronic Parkway
Minneapolis, Minnesota
USA
Booth #: 3
Booth #: 39, 42, 43, 44
https://www.medtronic.com/us-en/index.html
Making healthcare better is our priority and we believe technology can play an even greater role in improving people's lives. In addition to alleviating pain, restoring health, extending lives, we work in partnership with others to create seamless, more efficient care. Learn how we're taking healthcare Further, Together at Medtronic.com.

NALU MEDICAL

1525 Faraday Avenue, Suite 180
Carlsbad, California
USA
Booth #: 29
http://nalumed.com
Nalu Medical, Inc. is a privately held medical device start-up company. Our team of seasoned entrepreneurs, engineers and scientists are developing the next generation of medical devices. Our novel devices will address a number of poorly treated clinical conditions. Our company is located in Carlsbad, California with a vision to modernize and improve the technology in medical devices, thus improving lives of people.

NATIONAL MANUFACTURING CO., INC.

12 RIVER RD
Chatham, New Jersey
USA
Booth #: 08
http://www.natlmfg.com
ISO 13485 certified; 75 years in business; specialists in precision deep & shallow drawn metal enclosures for implantable cardiac and neurostim devices, in various grades of titanium and stainless steels. In-house tool design/ fab, cell mfg, lean, six-sigma continuous improvement, concurrent engineering & statistical tools to assure product quality.

NEVRO

1800 Bridge Parkway
Fairfield
USA
Booth #: 03A
http://www.nevro.com/
Nevro is a global medical device company focused on providing innovative therapies that improve the quality of life of patients suffering from chronic pain. Nevro's Senza® spinal cord stimulation system is an evidence-based neuromodulation platform developed for treating chronic pain and the only SCS system that delivers Nevro's proprietary HF10™ therapy.

NIMBUS

6030 W. Harold Gatty Drive
Salt Lake City, Utah
USA
Booth #: 32
http://www.nimbusconcepts.com
Nimbus, a novel RF electrode, was developed to produce a larger volume, optimally shaped lesion approximately 8-10 mm in diameter, to enable pain management specialists to more predictably target ablation, including anatomic variation, using technically simple, easily mastered electrode placement techniques. The Nimbus RF electrode increases the functional electrode surface area, spreads electrical current density and increases the volume of tissue heated resulting in a larger ablation zone.

NUVECTRA

BRONZE LEVEL SUPPORTER

5830 Granite Parkway, Suite 1100
Plano, Texas
USA
Booth #: 12
https://www.nuvectramed.com/

Nuvectra® is a neuromodulation company committed to helping physicians improve the lives of people with chronic conditions. The Algovita® Spinal Cord Stimulation (SCS) System is our first commercial offering and is FDA approved and CE marked for the treatment of chronic pain of the trunk and/or limbs. Our innovative technology platform also has capabilities under development to support other neurological indications such as sacral nerve stimulation (SNS), and deep brain stimulation (DBS). In addition, our NeuroNexus subsidiary designs, manufactures and markets leading-edge, neural-interface technologies for the neuroscience pre-clinical research market.

SALUDA MEDICAL

BRONZE LEVEL SUPPORTER

Ground Floor, 407 Pacific Highway
Artarmon, New South Wales
Australia
Booth #: 19
https://www.saludamedical.com/

Saluda Medical is a global medical device company focused on patient outcomes, science, and engineering to transform the neuromodulation industry with a platform of closed-loop technologies based on the evoked compound action potential (ECAP). Saluda's first device is Evoke®, an ECAP-Controlled Closed-Loop Spinal Cord Stimulation (SCS) System. Evoke measures the spinal cord's response to stimulation, adjusts on every pulse to optimize activation within the patient's therapeutic window, and maintains long-term results through ECAP control. It's currently under investigation through the first double-blinded US approval study in SCS. Saluda is pursuing CE Mark, TGA approval, and FDA approval of Evoke.

STIMWAVE

PLATINUM LEVEL SUPPORTER

1310 Park Central Blvd S
Pompano Beach, Florida
USA
Booth #: 04
http://stimwave.com

Stimwave's Freedom SCS & PNS System, the world's only fully programmable wireless stimulator platform for Dorsal Root Ganglion, Peripheral Nerve and Spinal Cord Stimulation, features the world's smallest, microsize neurostimulator, 35x-100x smaller than other systems. Revolutionizing the industry with sleek, easily wearable technology for patients needing pain management. Freedom is the only Battery-Free, Surgery-Free, and Opioid-Free Neurostimulator. Stimwave's SCS System in the SURF RCT, demonstrated an average of 76% Reduction in Back Pain, with 88% of the patients in chronic pain remission at 6 months.

VELENTIUM

22316 Grand Corner Drive, Suite 150
Katy, Texas
USA
Booth #: 13
http://www.velentium.com

Velentium is a professional engineering firm, specializing in the design and development of secure implantable devices, medical apps, and medical device data systems. World Class Expertise in: • Systems Design • Embedded Cybersecurity • Electrical and Mechanical Development • Firmware • Software • Mobile Apps • Cloud-based Applications • Test Systems • Prototyping and Manufacturing (FDA manufacturer of record) We've implemented an ISO 13485 certified quality management system to create safe, effective, and compliant technical solutions and products that improve people's lives and better our world.

State of the Art Safety Standards in RA
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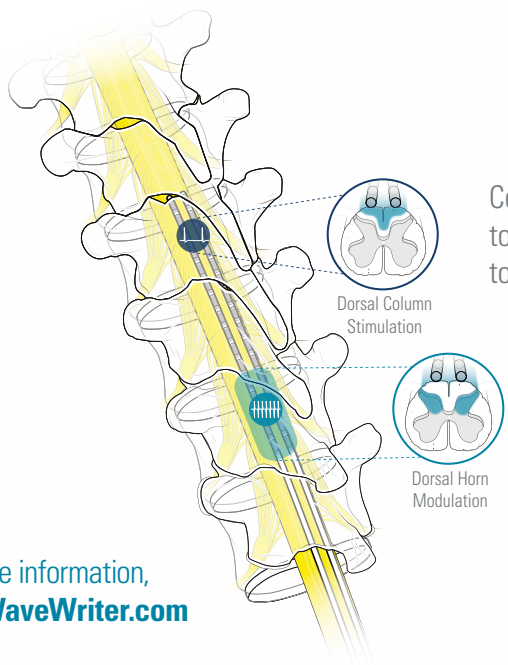
Boston Scientific
Advancing science for life™

SPECTRA WAVEWRITER™
Spinal Cord Stimulator System

PROVEN PAIN RELIEF WITH COMBINATION THERAPY[1]



Combination Therapy is designed to engage multiple mechanisms to deliver lasting relief to more patients.

For more information, go to **WaveWriter.com**

MULTIPLE THERAPIES.
ONE DEVICE.

This product is not available for supply in Australia

1. Metzger et al., INS European Chapters 1st Joint Congress, 2018, N=217

US Indications for Use: The Boston Scientific Spinal Cord Stimulator Systems are indicated as an aid in the management of chronic intractable pain of the trunk and/or limbs including unilateral or bilateral pain associated with the following: failed back surgery syndrome, Complex Regional Pain Syndrome (CRPS) Types I and II, intractable low back pain and leg pain. Associated conditions and etiologies may be: radicular pain syndrome, radiculopathies resulting in pain secondary to failed back syndrome or herniated disc, epidural fibrosis, degenerative disc disease (herniated disc pain refractory to conservative and surgical interventions), arachnoiditis, multiple back surgeries. Contraindications, warnings, precautions, side effects. The SCS Systems are contraindicated for patients who: are unable to operate the SCS System, have failed trial stimulation by failing to receive effective pain relief, are poor surgical risks, or are pregnant. Refer to the Instructions for Use provided with the SCS System or ControlYourPain.com for potential adverse effects, warnings, and precautions prior to using this product. Caution: U.S. Federal law restricts this device to sale by or on the order of a physician.

Outside of US Indications for Use: CAUTION: The law restricts these devices to sale by or on the order of a physician. Indications, contraindications, warnings and instructions for use can be found in the product labelling supplied with each device. Information for use only in countries with applicable health authority registrations. Material not intended for use in France. Products shown for INFORMATION purposes only and may not be approved or for sale in certain countries. Please check availability with your local sales representative or customer service.

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