wssfn
World Society for Stereotactic and Functional Neurosurgery

Konstantin Slavin, MD

Letter From The President

Dear Colleagues,

This is the first newsletter in my new role of the WSSFN President – and, understandably, I want to start it with a deep appreciation of the great honor given to me by the Society and each of you individually! I clearly understand the tremendous responsibility that comes with this honorable position, and count on the support of Past Presidents, current Executive Council and Board members, all those who are – or want to be – involved in the work of our professional society. Fortunately, we are now stronger than ever, and the enthusiasm toward stereotactic and functional neurosurgical interventions is reaching new heights with clinical and technological advancements across the spectrum of our specialty.

The recent WSSFN Congress in Seoul under leadership of Drs. Chang, Lee, Hodaie, Doshi, Sun and Bloch was much more successful than anyone could predict! Despite all possible hardships, including rescheduling due to COVID-19 pandemic, travel restrictions, flight rerouting, economic and political instability, war in Ukraine, and even a typhoon in the middle of the conference, the Congress was remarkable in every possible way. The highest level of presented science, wide spectrum of topics and workshops, stellar lineup of speakers, impressive venue and unmatched social program were supplemented by extraordinary hospitality from our Korean hosts! As many of you remarked in Seoul, it will be hard to match this level of enthusiasm and innovation at our future congresses – but we will definitely try!

As a matter of fact, while most of us are still recovering from overwhelming experience of our 19th Congress, the preparation is already underway for our next gatherings: the Interim 2023 WSSFN Congress in Dubai in November, and XX World Congress of Stereotactic and Functional Neurosurgery in Chicago in September, 2024. The international scientific program committee for the Chicago meeting has already been formed and the arrangements for venue and dates have been finalized. The 2024 Congress will be dedicated to the celebration of the 75th anniversary of modern stereotaxis – there will be more information forthcoming with the meeting details and deadlines in the near future (the website for the congress https://wssfn2024.org/ is already up and running).

Before I wrap up this message, I want to congratulate each one of you with a new holiday that the WSSFN is promoting: starting on November 24, 2022, the WSSFN along with several other professional societies established the World Radiosurgery Day. This date is the birthday of Swedish Neurosurgery's Professor Lars Leksell, one of the founders of the modern stereotactic and functional neurosurgery, who is considered the "father of radiosurgery". This celebration starts a new tradition in our society and commemorates neurosurgical contribution to this multi-disciplinary phenomenon.

Although a new Board of Directors and new Officers were elected in Seoul, any member of the WSSFN can get involved in the society. Contributions to this newsletter may be sent to the newsletter editor Dr. Harith Akram; our plan at this point is to have our newsletter to provide members with a quarterly update of Society activities, so please check your mailbox and the Society website on a regular basis.

Konstantin Slavin, MD
Chicago, Ill.

Harith Akram, MBChB PhD FRCS (Neuro.Surg)

Letter From The Editor

I would like to wish members and friends of the WSSFN a happy new year and thank them for their invaluable contributions to this Winter 2023 edition of the WSSFN Newsletter. 2022 saw a tremendously successful biennial WSSFN Congress in Incheon, Korea under the presidentship of Dr Jin Woo Chang. Dr Chang, the Education, and the Organising Committees are to be commended for making it a highly educational, informative, and enjoyable meeting. With this, Dr Chang's term as president of our society has come to an end, and I am sure, you would all join me in thanking him wholeheartedly for the excellent job he has done, successfully steering the society through challenging times. Now we welcome Dr Slavin to his new role as president. You will have grasped from his first letter, the commitment and drive to take the WSSFN forwards and to organise an undoubtedly successful 20th Congress of the WSSFN in Chicago, USA in 2024. Now I know I am already looking forward to that meeting.

In this issue, you will find a letter from Dr Chang depicting the difficulties and successes of the WSSFN Congress in Korea as well as details of the awards given at the meeting. We have a letter from Professor Coenen and colleagues on the inaugural meeting of the Center for Deep Brain Stimulation - Psychiatric Surgery Summit in Freiburg, Germany. The meeting was a renowned success with various international experts in attendance. Future biennial meetings are to be organised. There is also an article by Dr Shiro Horisawa advocating for and raising awareness of the use of Vo thalamotomy for focal hand dystonia. 'Letter from Kyiv' is a moving account by Dr Kostiuk of the struggles stereotactic and functional neurosurgery have been going through as a result of the Russian war in Ukraine. We have our (now regular) section on 'Hot Topics' in functional neurosurgery by Professor Hariz. And finally, a 'colourful' article by Professor Hariz and Professor Blomstedt on the rise of 'technicolour' imaging in functional neurosurgery. This is a hotly contested topic and I hope you, like me find this article thought provoking and just maybe, it would induce a healthy debate in future submissions.

Editor in Chief
Harith Akram, MBChB PhD FRCS (Neuro.Surg)

Have feedback or news to share?
Contact us! Melody Dian mdian@centurytel.net

Jin Woo Chang, M.D., Ph.D.

Letter From The Past President

The 19th World Society for Stereotactic and Functional Neurosurgery Congress was held in Incheon, South Korea from the 4th to the 7th of September 2022. I, as an immediate past president of the WSSFN, would like to thank all of our society members for attending, even though we had many obstacles to overcome while we were preparing our Congress.

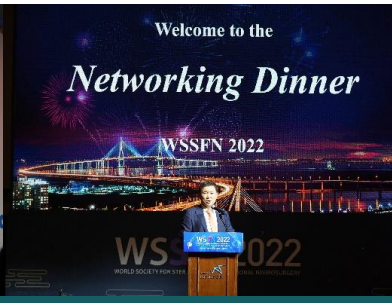
After the success of the WSSFN Congress in New York, 2019, we started to prepare the next meeting that was to be held in 2021. None of us would have expected or anticipated any upcoming pandemics and we then hoped we would get over the challenges imposed on us before long. However, we finally had to decide to postpone WSSFN 2021 until 2022 after several meetings with the scientific committee and officers, as we had nothing to help us predict what would happen in the near future. We had to decide and choose how we would operate our Congress with new formats from virtual, in-person, and hybrid.

Even though we had to postpone our WSSFN 2021 meeting, our scientific committee members led by Dr. Kendall Lee, had 4 virtual workshops to boost morale, and also to attract attention to the WSSFN 2022 congress.

In early 2022, we still had a lot of worries about holding the event due to the outbreak of COVID-19, but fortunately, COVID-19 had eased a lot from March, and we began to enter a stable period in Europe and the United States and with courage, we began to prepare for in- person meetings. We also put a great deal of effort towards inviting our sponsors, and would like to thank them with our sincere gratitude.

It was such a difficult situation, but we had about 700 participants in total, and surprisingly, 70% of our participants were from abroad. It was a big success since we had only expected 300 to 400 participants for WSSFN 2022. Moreover, while we were having the Congress in Incheon, there was news that a powerful typhoon would come. Needless to say, we worried! Luckily, this only led to the conference venue to be filled with delegates. As we were the first committee to prepare a WSSFN Congress in post-COVID era, we tried our best to protect our attendees from illness, and we were very happy not to have any COVID 19 cases during the meeting.

I would like to take this opportunity to thank everyone who attended the WSSFN 2022, and I hope that we can meet at the 2024 Congress even if you could not attend last time.



Editor in Chief
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ISMRM ONE COMMUNITY FOR CLINICIANS AND SCIENTISTS

World Society for Stereotactic and Functional Neurosurgery

Joint High Field Systems & Applications Study Group and World Society for Stereotactic and Functional Neurosurgery (WSSFN) Virtual Meeting

7T MRI in Functional Neurosurgery: What Now, What Next?

31 January 2023 at 20:00 UTC
Length: 1.5 hours

Registration is **FREE** for WSSFN members, US$50.00 for non-members.

Moderators: Maxime Guye, M.D., Ph.D., Noam Harrel, Ph.D., Erik H. Middlebrooks, M.D., and Jean Regis, M.D.

Why Do I Use 7T MRI in My Clinical Practice?

Sanjeet S. Grewal (M.D.
Mayo Clinic
Jacksonville, FL, USA

Why Do I Use 7T MRI in My Clinical Practice?

Michael C. Park (M.D., Ph.D.
University of Minnesota
Minneapolis, MN, USA

Why Don't I Use 7T MRI in My Clinical Practice?

Martin Jakobs (M.D., Ph.D.
University Hospital Heidelberg
Heidelberg, Germany

Discussion (30 minutes)

Further information can be found on the website of ISMRM :
https://www.ismrm.org/virtual-meetings/

WSSFN members please use code when registering
PROMO CODE: 2023_HIGHFIELD-WSSFN

Editor in Chief
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World Society for
Stereotactic and Functional
Neurosurgery

WSSFN 2024

CHICAGO, USA
2-6 SEPTEMBER

Celebrating the 75th Anniversary
of Modern Stereotaxis

SAVE THE DATE

XX WORLD CONGRESS OF STEREOTACTIC AND FUNCTIONAL NEUROSURGERY

www.wssfn2024.org

AWARDS 2022

WSSFN 2022
WORLD SOCIETY FOR STEREOTACTIC & FUNCTIONAL NEUROSURGERY

SEPTEMBER 4 - 7, 2022
SONGDO CONVENSIA, INCHEON, KOREA

Neuromodulation: Shaping the Future

The WSSFN would like to congratulate all the award winners who exemplify their interest in stereotactic and functional neurosurgery!

Spiegel-Wycis Award

Andres Lozano | CANADA
Takaomi Taira | JAPAN

President's Award

Mojgan Hodaie | CANADA

Tasker Award

Joachim Krauss | GERMANY

SANG SUP CHUNG AWARD:

The WSSFN leadership is pleased to announce two new awards in(clinical and research) in honor of the deceased professor Sang Sup Chung (1938-2021). The awards are 2500 USD each. The awards bestowed during the 2022 WSSFN meeting in Korea. The aim of the Sang Sup Chung clinical award is to recognize the important pioneering clinical researchers in the field of stereotactic and functional neurosurgery in the Asian region. And the aim of the Sang Sup Chung research award is to recognize the innovative and pioneering basic and research work in the field of stereotactic and functional neurosurgery in the Asian region.

Clinical Award

Takamitsu Yamamoto
JAPAN

Spinal cord stimulation for vegetative state and minimally conscious state.

Research Award

Zang Hee Cho
KOREA

Developed the world first PET scanner in 1975 and the pioneer of CT and MRI.

WSSFN 2022 AWARDS CEREMONY

Best Oral Presentation - Clinical

USA

Evolution Of Targeting Of The Anterior Limb Of The Internal Capsule Circuits For Obsessive Compulsive Disorder: Multi-institutional Experience

Josue Avecillas Chasin, Kisueng Choi, Andrew Smith, Helen Mayberg, Brian Kopell, Martijn Figee

Best Oral Presentation - Basic Science

Canada/ Switzerland

Unbiased Whole Brain Circuit Examination Reveals Novel Neurons That Restore Locomotion After Spinal Cord Injury

Newton Cho, J. Squair, N. James, L. Baud, A. Leonhartsberger, K Sveistyte, K Galan, Q Barraud, M Goubran, L Batti, S Pages, M Gauthier, T Hutson, C Kathe, A Bichat, O Rizzo, M Hodara, J Bloch, G Courtine

Best Poster Presentation - Clinical

Germany

Effects Of Thalamic DBS For Tourette's Syndrome in a Prospective Randomized Clinical Trial

Pablo Andrade, Juan Carlos Baldermann, Veerle Visser-Vandewalle

Best Poster Presentation - Basic Science

Korea

Enhanced Delivery Of Aducanam Via FUS Alleviates Cognitive Impairment In Neuropathology In Alzheimer's Disease

Chanho Kong, Eun-Jeong Yang, Jaewoo Shin, Junwon Park, Won Seok Chang, Changhan Lee, Hyunju Kim, Hye-Sun Kim, Jin Woo Chang

Karger Award - Best Oral Presentation

Germany

Extensive Frontal Focused Ultrasound Mediated Blood-brain Barrier Opening for the Treatment of Alzheimer's Disease

So Hee Park, Kyoungwon Bail, Seun Jeon, Won Seok Chang, Byong Seok Ye, Jin Woo Chang

Karger Award - Best Poster Presentation

USA

Differences In STN Subregional Activity During Performance Of A Motor Conflict Task In Humans WIth Parkinson's Disease

Travis Stewart, Jessica McDonnell, Joseph Neimat, Scott Wylie, Neileke Van Wouwe

Karger Award - Best Oral Presentation

RUNNER UP

USA

Sub-second Fluctuations of Extracellular Dopamine And Serotonin Levels Encode Learning Signals That Influence Behavioral Control And Conscious Phenomena Experience In Humans

Kenneth Kishida, Adrian Laxton, Stephen Tatter

Karger Award - Best Poster Presentation

RUNNER UP

Australia

Prospective Randomized Clinical Study: Does TYRX Antibiotic Envelope For DBS IPG Replacement Affect IPG Infection Rate?

Terry Coyne, Michael Colditz, Tomas Heard, Peter Silburn

WSSFN 2022 AWARDS CEREMONY *(CONT.)*

Best Oral Presentation - Honorable Mention #1
Netherlands

7 Years Of 7-tesla In Deep Brain Stimulation For Parkinson's Disease: Pinpointing The Dorsal STN

Maarten Bot, Neils Rijks, Lisa Verlaat, Naomi Kremer, Varvara Mathiopoulou, Francisca Ferreira, Mark Robers, Rob de Bie, Pepijn van den Munckhof, Rick Schuurman

Best Oral Presentation - Honorable Mention #2
Croatia

Diffusion Tensor Imaging Evaluation Of Patients With Disorders Of Consciousness Prior To Deep Brain Stimulation: A preliminary Study

Marina Raguz, Darco Oreskovic, Andelo Kastelancic, Petar Marcinkovic, Marin Lakic, Fadi Almahariq, Dominik Romic, Domagoj Dlaka, Niko Radovic, Igor Fuckan, Vedran Deletis, Darko Chudy

Best Poster Presentation - Honorable Mention #1
Vietnam

The Effect Of Pulsed RF Combined With A Transforaminal Epidural Steroid Injection On Chronic Lumbar Radiculopathy – Vietnam Prospective Study

Viet-Thang Le, Tuan An Pham

Best Poster Presentation - Honorable Mention #2
Canada

An Artificial Intelligence-driven System of Grading Trigeminal Neuralgia And Prediction of Surgical Outcome

Timur Latypov, Rose Yakubov, Peter Hung, Pascale Tsai, Matthew Walker, Wanzhang Wai, Marina Tawfik, Frank Rudzicz, Mojgan Hodaie

THANK YOU TO OUR JUDGES!

ORAL PRESENTATIONS:

- Patric Blomstedt – Sweden
- Marie Krueger – UK
- Hiroki Toda – Japan

POSTER PRESENTATIONS:

- Nico Enslin – South Africa
- Olga Parras – Spain/UK
- Can Sarica – Canada/Turkey

19th Biennial Meeting of the
World Society for Stereotactic and Functional Neurosurgery
Incheon, Korea, September 4–7, 2022

Abstracts

Guest Editors
Mojgan Hodaie, Toronto, ON, Canada
Stephan Chabardes, Grenoble, France
Jung-Il Lee, Seoul, Korea
Joseph Neimat, Louisville, KY, USA
Ido Strauss, Tel Aviv, Israel
Hemmings Wu, Hangzhou, China

Scientific Program Committee
Kendall Lee, Rochester, MN, USA
Jocelyne Bloch, Lausanne, Switzerland
Paresh Doshi, Mumbai, India
Mojgan Hodaie, Toronto, ON, Canada
Yoonbae Oh, Rochester, MN, USA
Hojin Shin, Rochester, MN, USA
Bomin Sun, Shanghai, China

Psychiatric Surgery Summit

Inaugural Meeting of the Center for Deep Brain Stimulation

Freiburg Germany 27th-29th October

The Center for Deep Brain Stimulation at the University of Freiburg was founded in March 2020 and has now been formally inaugurated. The local initiators Thomas Schläpfer (Psychiatrist), Volker Coenen (Neurosurgeon) together with Bastian Sajonz (Neurosurgeon, congress Secretary) invited international faculty for two and a half days of scientific presentations and discussions on the latest research on DBS and lesioning in psychiatric indications. There were around 120 participants (60 either online or on site, hybrid meeting).

Two key-lectures were given by Joe Fins (Ethicist, Cornell, New York) and Marwan Hariz (Neurosurgeon, Umea, Sweden) on historical aspects of psychiatric surgery followed by 24 high level scientific presentations over the next two days. Experts in the field presented the newest research and discussed implications of surgical approaches on key diseases like major depression, OCD, Gilles de la Tourette syndrome, tic diseases, Alzheimer's disease and others. Basic research and translational science was covered and also newest imaging technologies. It was a very pleasant meeting in lovely and unusually warm Freiburg with a very sophisticated program which allowed for far reaching discussions.

Upon request by the participants, this meeting is planned to be repeated bi-yearly. The next meeting is planned for the end of October 2024, again in Freiburg. Do not hesitate to reach out if you want further information or be put on the invitation list for the next meeting.

Volker A. Coenen
Thomas Schläpfer
Bastian Sajonz
Freiburg, Germany

1st Psychiatric Surgery Summit (2022) in Freiburg, Germany: **1**, Thomas Schläpfer (Psych, Freiburg); **2**, Al Fenoy (Nrsrg, New York City); **3**, Veerle Visser-Vandewalle (Nrsrg, Cologne); **4**, Jean Regis (Nrsrg, Marseille); **5**, Carlos Balderman (Psych, Cologne); **6**, Andres Lozano (Nrsrg, Toronto); **7**, Yasin Temel (Nrsrg, Maastricht); **8**, Robert Gross (Nrsrg, Atlanta); **9**, Isidoor Bergfeld (Nrpsych, Amsterdam); **10**, Peter Reinacher (Nrsrg, Freiburg); **11**, Damiaan Denys (Psych, Amsterdam); **12**, Pepijn v.d. Munckhof (Nrsrg, Amsterdam); **13**, Máté Döbrössy (Nrscie, Freiburg); **14**, Sergiu Groppa (Neurol, Mainz); **15**, Bastain Sajonz (Nrsrg, Freiburg); **16**, Volker Coenen (Nrsrg, Freiburg).

Other active participants (not shown): Mircea Polosan (Psych, Grenoble); Ulf Ziemann (Neurol, Tübingen); Timothy Denison (BiomedEng, Oxford); Andreas Horn (Neurol, Boston); Philipp Kellmeyer (Ethics, Freiburg), Sameer Sheth (Nrsrg, Houston), Özgür Onur (Neurol, Cologne).

Online active participants (not shown): Joe Fins (Ethics, New York); Marwan Hariz (Nrsrg, Umea); Wayne Goodman (Psych, Houston); Phil Starr (Nrsrg, San Francisco); Cameron McIntyre (BiomedEng, Durham); Phil Mosley (Psych, Brisbane); Mike Okun (Neurol, Gainesville).

Editor in Chief
Harith Akram, MBChB PhD FRCS (Neuro.Surg)

Have feedback or news to share?
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Raising Awareness of Neurosurgery for Focal Hand Dystonia

Shiro Horisawa
Assistant Professor, Department of Neurosurgery, Tokyo Women's Medical University, Tokyo, Japan

On November 18, 2022, a press conference on the research into the treatment of focal dystonia was organized by the World Health Organization (WHO) at the United Nations Building in New York City. Focal hand dystonia is a disease that can be associated with a variety of occupational movements and is considered a potentially career ending condition for musicians. It is treated with oral medications and botulinum toxin injections with a varying response rate.

One option in refractory cases is neurosurgery. Siegfried in Switzerland described dramatic improvement in writer's cramp in a case report in the 1960s. Taira, Horisawa, and others have also shown that focal hand dystonia caused by various occupational movements, including those of musicians, can be surgically improved to return to their professional performances. Nevertheless, this treatment option does not seem to have garnered wide recognition.

A strong advocate for the awareness of focal dystonia at the WHO is the Brazilian pianist and conductor Joao Carlos Martins. Known as a virtuoso performer of Johann Sebastian Bach's works, he made his Carnegie Hall debut as a pianist at the age of 21. He has experienced various hardships, including ulnar nerve damage in his right arm, an intracranial injury from an assault, and dystonia in his left hand. These cruel misfortunes robbed him of the ability to play as a pianist, leading him to become a conductor. Still, he persevered and even played the piano at the opening ceremony of the Rio de Janeiro Paralympic Games in his native Brazil in 2016, using his limited movable fingers. He went through more than 20 surgeries, including deep brain stimulation, but was unable to regain his professional performance as a pianist, ending his career in 2019. In 2020, Martins was able to achieve some finger movement by wearing special bioengineered gloves created with a 3D printer, and his performance on the piano was broadcast in media outlets around the world (https://www.youtube.com/watch?v=21TtI48XU54&t=7s). The symptoms caused by dystonia have been the most challenging of his career and have doomed his ability to be a pianist. He has therefore worked with the WHO to organize this conference in the hopes of raising awareness of the treatment and research for this disease around the world. Also attending the conference, was Professor Steven J. Frucht MD from the department of neurology at New York University. Other participants included several neurologists from Brazil and several neurophysiologists from Korea. Current treatments and challenges of focal

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Editor in Chief
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WHO Press Conference *(CONT.)*

dystonia were discussed. It was disappointing to learn that at least in the U.S., neurosurgery for focal dystonia is underutilized despite the possibility of the complete cure it can provide. Surgery does carry a risk nonetheless, and complications can lead to loss of fine motor control of the hand, nevertheless, if the musician is unable to play at all, I believe that surgery should be considered. Moreover, I have also reported dramatic improvement of dystonia with oral zolpidem. Thanks to this drug, I have recently had a drastic reduction in the number of surgical procedures for focal dystonia. Sadly, the use of zolpidem to treat focal hand dystonia is not widely practiced. I recall seeing Dr. Taira's radiofrequency ventro-oralis (Vo) thalamotomy for the first time, I wondered why this procedure is not performed more around the world. Since then, I have written several papers on the effectiveness of this surgery with the aim of making it known to more people. Over the last 10 years, awareness of this surgery has gradually increased. In India, Doshi and Sharan Srinivasan are actively performing this surgery. I hope to see more of this surgery performed in London by Zrinzo and Akram in the near future. However, I still feel that many physicians examining patients with focal dystonia do not have sufficient understanding of the disease. Evidence of therapeutic efficacy through high quality randomized studies is needed. Fortunately, with focused ultrasound, randomized studies can be ethically performed. My goal for the next step is to examine the efficacy and safety of focused ultrasound Vo thalamotomy through a randomized study. Demonstrating this will improve the acceptance of this

treatment, making it more accessible to patients around the world.

The day after the conference, a concert was held at Carnegie Hall, conducted by Joao Carlos Martins to celebrate his 60 years of fighting the disease as a professional pianist. A large audience enjoyed Martins' performance and praised him for his hard work. He is over 80 years old and has not yet given up on his professional career as a pianist. I, like him, will not give up and will continue to research for even better treatments.

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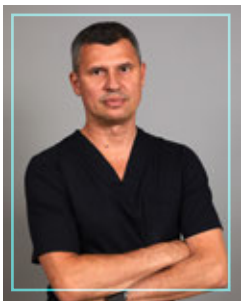


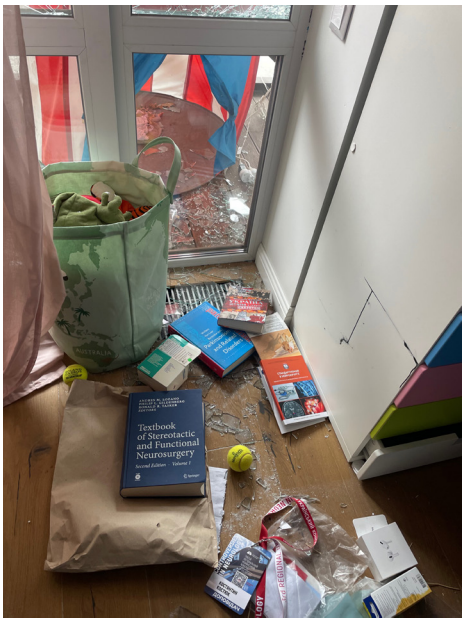
Kostiantyn Kostiuk MD, PhD
Head of Department of Functional Neurosurgery and Neuromodulation Romodanov Neurosurgery Institute, Kyiv, Ukraine

Letter from Kyiv

Over ten months have passed since the Russian military attacked Ukraine and started the largest war in Europe since 1945. Since then, many cities and villages have been destroyed in the north, east and south regions of Ukraine. Thousands of humans have been killed and over seven million refugees had to flee the country, with every effort being made to save the lives of women and children. Approximately, one-quarter of the country's total population had left their homes by the end of March 2022.

Before the war, healthcare in general, and neurosurgery in particular had been constantly improving, despite financial challenges. At that time limited numbers of neurosurgical centres routinely used modern neurosurgical equipment and instruments for highly qualified neurosurgical care. A full range of functional neurosurgical procedures for patients with epilepsy, movement disorders, and chronic pain were available only at the Romodanov neurosurgery institute.

During the months of war, the Russian military either completely or partially destroyed civilian hospitals in the north and east regions of Ukraine. Other hospitals continue to work under bombing, shelling and missile attacks (Kharkiv, Zaporozhye, Mykolaiv…etc.). Many patients had to stay in hospitals because their dwelling places were occupied or destroyed. The healthcare system suffered significantly from the damage and destruction of hospital facilities, the medical supply system and other logistics. For the first few months, most neurosurgical units admitted wounded military and civilians, and only a few departments in the west part of Ukraine provided elective neurosurgical operations, serving the 8 million people who had been internally displaced , seeking safety in the west of the country.



Because of the uncertain and dangerous situation in Kyiv, all functional neurosurgical operations were put on hold as all efforts focused on providing supply of medication for patients, many of whom needed regular use of specific medications (e.g., antiepileptic drugs and Parkinson's medications). Intensive support from international humanitarian and professional medical organisations provided much needed (partial) relief. For example, the International League Against Epilepsy (ILAE) and the International Bureau for Epilepsy (IBE) formed an Emergency Response (Ukraine) Task Force, headed by the President of the ILAE, Professor J. Helen Cross, providing a fast reaction to war related challenges.

Since the middle of April, the Romodanov Neurosurgery Institute restored all forms of neurosurgical care. During the war, many DBS patients had to leave charging systems at home during emergency evacuation and could only retrieve them after the Russian occupants had left. For these periods, some of our patients were sharing charging system with each other. This experience demonstrated a new benefit of lesioning operations in functional neurosurgery, as patients are not dependent on additional devices and regular hospital visits. Currently, when I discuss the surgical options with patients who are good candidate for DBS treatment, I point out the advantages and disadvantages of rechargeable systems in comparison with primary cell IPGs and lesioning operations.

Functional neurosurgery is a highly technical field of neurosurgery, which requires significant financial support. In the foreseeable future, we do not expect sufficient support from the government, as most of the Ukrainian budget is likely to go towards rebuilding civilian infrastructure. Supporting emergency medical care and rehabilitation will have to take priority in the near future. Support from international funds, professional societies and global medical device companies will be needed to maintain the development of functional neurosurgery in Ukraine. I propose to open a discussion regarding the creation a special support program for functional neurosurgery in Ukraine, headed by the WSSFN to provide financial and

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Editor in Chief
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Ukraine Healthcare in Kyiv *(CONT.)*

technical help in order to keep functional neurosurgery going.

Lastly, I would like to express my great appreciation to colleagues and friends I met at the 19th Biennial Meeting of the WSSFN in Incheon, Korea for expressing their endless support for Ukraine. This support makes me confident in the ability to maintain and drive further advances in functional neurosurgery during these difficult times that I and my fellow citizens are going through.

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Imaging in functional stereotaxis: from 50 shades of grey to technicolour, and from individualist to "communist" targeting?

Marwan Hariz, MD, PhD and Patric Blomstedt, MD, PhD
Professors of Stereotactic Functional Neurosurgery
Dept of Clinical Neuroscience / Unit for Deep Brain Stimulation
University Hospital of Northern Sweden, 90185 Umeå, Sweden

Dear Reader, please do not be put off by the title of this article. It may be perceived provocative but what is "provocative" here? It is just to provoke a sound reflection on, and a sober meditation about, where our field of stereotactic imaging is going.

Since the word "communist" is in the title –and we shall explain why further below–, let´s start with a quote from the first page of Karl Marx´ and Friedrich Engels´ Manifesto from 1848: "A spectre is haunting Europe – the spectre of communism..."

To paraphrase this quote and put it in our context we declare: a spectre is haunting stereotactic functional neurosurgery –the spectre of aggregated and normalized data; the spectre of mean and standard deviations, the spectre of the MNI (Montreal Neurological Institute) brain template as the latest gospel for illustrating DBS electrode locations; the spectre of the multi-coloured imaging that makes of us true V.O.M.I.Ts. (Victims Of Modern Imaging Technologies [BMJ 2003;326:1273]).

In the following, we shall expand on these concepts and their influences on our field.

In this era of "personalized" medicine and "tailored" treatment adapted to the individual patient, our field of stereotactic functional neurosurgery is forgetting that its pioneers were the real champions of personalized stereotaxis, of individual targeting indeed adapted to the anatomy of the individual patient. The Atlases of the brain that they developed were aimed at instructing about the names of the various nuclei and pathways, their anatomical relation to each other and to the ventricular landmarks. BUT, when it came to targeting in view of making a lesion (or implanting electrodes), our ancestors went out of their way to VERIFY in each individual and indeed in each brain hemisphere, the accuracy of targeting by: intraoperative stimulation; cooling; reversible heating; semi-microelectrode recording, microelectrode recording, etc, and then by trying to image on stereotactic X-ray the location of the lesion by injecting contrast, leaving a sliver clip, inflating a balloon etc at the site where they made the lesion.

FROM 50 SHADES OF GREY TO TECHNICOLOUR IMAGING

THE whole history of stereotactic functional neurosurgery has been centred primarily –although not exclusively– on imaging. Imaging has allowed the initial targeting of a brain structure, imaging has dictated the geometry and design of the stereotactic frame, imaging has allowed verification of targeting accuracy intra- or postoperatively. At each period of advance in imaging, the primary aim was to try

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Editor in Chief
Harith Akram, MBChB PhD FRCS (Neuro.Surg)

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Imaging In Functional Stereotaxis *(CONT.)*

to visualize, i.e., to "see" the target and "see" if the target was reached by the stereotactic procedure, be it a lesion or a DBS procedure. The aim of the atlas was to disclose, based on one or very few post-mortem brains, the three-dimensional locations of various subcortical nuclei and pathways, in relation to internal landmarks, be it the corpus pineale and foramina of Monro (such as in the first atlases of Spiegel and Wycis) or in relation to the AC and PC such as in the Talairach´s and Schaltenbrand et al´s atlas, taking into consideration that one needed at least three different post-mortem brains to depict the horizontal, coronal and sagittal aspects, respectively, of the named nuclei and pathways. Then it was stereotactic ventriculography (VG) using air or contrast agent that allowed to visualize the landmarks, and based on the atlas, one could infer the initial and presumed location of a subcortical brain target that needed to be verified by macro-stimulation and later-on by MER, prior to lesioning. Then, another stereotactic imaging took place using stereotactic plain X-ray to verify the location of the lesion, which was marked either by injection of a tiny amount of contrast (Spiegel-Wycis, Cooper), or by placing sliver clips at the site of the lesion (Leksell, Gillingham), because neither the lesion itself nor brain parenchyma could be visualized on X-rays.

THE advent of CT scan revolutionized stereotactic imaging in five fundamental ways:

1. CT provided axial (horizontal) views of the head whereas VG provided frontal and side views.
2. CT dictated a re-labeling of coordinates: the previous Z for laterality became X; the previous Y for dorso-ventral direction became Z; and the previous X for anteroposterior direction became Y.
3. CT dictated a complete re-design of stereotactic frames to allow compatibility with this new imaging technology.
4. CT allowed visualization of the brain parenchyma and CSF spaces without the use of contrast agents.
5. CT permitted for the first time a visualization of the stereotactic lesion in the living brain, (and subsequently visualization of the DBS electrode artifact); hence, no more doubt about the accuracy of targeting that could now be verified in vivo, at least in relation to the visible ventricular landmarks on the axial CT scans.

The advent of MRI, - apart from dictating a re-design of stereotactic frames for magnetic field compatibility, contributed when judiciously used with appropriate scanning sequences, to perfect the imaging procedure, providing scans in various planes with good discrimination between grey and white matter, allowing to visualize in each brain hemisphere most brain targets and allowing a superb view of the location of the stereotactic lesion or the DBS lead in each patient. All this could be done and can still be done with 1.5 Tesla MRI where virtually all brain targets used for lesion or DBS can be individually visualized both before AND after the stereotactic procedure.

Such "fifty shades of grey images" have for long time adorned publications in which were included figures showing the location of lesions or DBS leads on MRI or on MRI fused with CT where anybody could see and judge the location of the lesion or the DBS electrode in either a typical individual patients (if the published cohort contained too many patients) or through multiple figures, one for each patient, in a small cohort of published patients. One could see and evaluate without difficulty the scattering of lesions or DBS electrodes in relation to the target structure and in relation to ventricular landmarks.

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Imaging In Functional Stereotaxis *(CONT.)*

FROM IMAGING TO IMAGINING?

The advent of powerful computers and "modern" imaging gurus, most of whom are not functional neurosurgeons, have now provided us with technicolour images where the basal ganglia are coloured in various colours and where cartoons representing the DBS leads are super implanted on the colourful anatomy in a way that truly muddies the water. No way any useful information can be extracted from such artistic images that remind more of a painting by Salvador Dali or Marc Chagall than of a sober anatomical figure. Adding to this, now we have connectivity imaging using even more colours, purporting to show us the target and the location of the DBS leads.

All this in the spirit of generating aggregated data or normalized data. It looks nice and classy and modern, and it appeals to reviewers, editors, and journals, but its usefulness for learning where to target in an individual patient is zero.

Adepts of these kinds of imaging claim that the modern connectivity MR imaging is providing circuitry-based brain targets for DBS. The fact is that many of these circuitries being "discovered" on colourful diffusion imaging scans are well known long before imaging, concerning both their physiology and their anatomic location. To name but a few: the prefronto-thalamic pathways traversing the anterior limb of the internal capsule and the various nodes of the circuitry of Papez in psychiatric and behavioural surgery; the pallido-thalamic pathways terminating in Forel´s field in PD surgery, the cerebellothalamic pathways passing between the nucleus ruber and the STN on their way to the motor thalamus in tremor surgery; the lemniscal pathways in stereotactic surgery for pain; as well as many of the pathways mediating the propagation of epileptic seizures. In almost all these cases, modern connectivity imaging confirmed what was already known. This is NOT to denigrate the advances in, and beauty of, diffusion, connectivity imaging, and tractography as such; this is just to put into question the validity and reliability of such imaging in providing better and more accurate imaging of the target than the good old 50 shades of grey in view of stereotactic targeting in an individual patient.

Some state that such imaging contributes to science by extrapolating "from patient-specific to group analysis". This is the essence of this kind of socialist-communist science where the group is the norm and the individual and his/her specific characteristics are less important. The only problem here is that, whereas it is great to go "from patient-specific to group analysis", the reverse is not easy nor valid. The group analysis will not generate an individual target with exact coordinates for the individual lying on the operating table waiting to have a lesion or a DBS lead in his/her individual brain. Only proper structural imaging of this individual patient´s brain will provide the coordinates of the target specific to them.

No aggregated data, no MNI space, no technicolour images and no normalized coordinates are a guarantee to provide the accurate target coordinates for this individual patient. Proper functional stereotaxis will remain dependent on personalized individual fifty shades of grey and distortion-free structural MR imaging with sequences adapted to visualizing the brain target aimed at.

CONCLUSIONS

We conclude by summarizing our "worries" regarding the new polychromatic reality:

1. We acknowledge the scientific value and pedagogic potential of aggregated rainbow images, and we assume that the scientific community is well-aware of their limitations if applied to the individual patient. However, we are apprehensive that some may be taking these images at face value, overshadowing a proper individual structural MRI-based targeting.

2. Overpainting structural MR images may contribute to "muddying the water" and will remove us further away from the original data and should not be a surrogate for proper identification of brain targets that can indeed be visualized on structural MRIs by using appropriate scanning sequences.

3. It is not rare to see in the literature figures showing DBS leads (or even stereotactic lesions) claimed in the text to be in one location, while the provided 50-shades-of-grey images clearly depict the electrodes to be located somewhere else; so, when a publication is providing only multi-coloured images, any such discrepancy will go undetected by the reader.

4. Since it is more difficult and often impossible for a reader to base their own procedure on a coloured cartoon, this will reduce the practical value of such illustrations, as well as their scientific reproducibility.

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Hot Topics in Stereotactic and Functional Neurosurgery

(Review of recent publications, 23 June – 15 December 2022)

Never find the time to search PubMed and read all the new papers?

Below you will find a selection of recent publications. Use the link to the Stereotactic Academy to access a summary presented by Professor Marwan Hariz.

https://stereotactic.org/category/publications/

INTRODUCTION BY PROFESSOR MARWAN HARIZ

This episode of Hot Topics summarizes and comments on 22 papers on the following subjects: Movement Disorders, Psychiatry, minimally conscious state, and "varia" (memory, drink cocktails, serendipity and a Salpêtrière alienist-neurologist). The rate of publications, especially on DBS is still very high and, to be honest, very few are the papers that provide real new data or make a dent in the field. I tried to find papers with some interest or papers that one could rightly question, and I insist that whatever opinion or critic in my comments on the papers, these are my sole responsibility and do not involve any endorsement by the Editors of the Stereotactic Academy. As always, any feedback is welcome including critique, praise, protest etc, either on this platform or by email to me on marwan.hariz@umu.se or on m.hariz@ucl.ac.uk

To accompany this issue of Hot Topics, I borrow a quote attributed to Robespierre´s close assistant, Louis Antoine Léon de Saint-Just: "Tout est sain pour les sains" (Everything is sound [healthy] for the sounds [healthy])

MOVEMENT DISORDERS (12 papers)

Personalizing Deep Brain Stimulation Using Advanced Imaging Sequences. Neudorfer C, Kroneberg D, Al-Fatly B, Goede L, Kübler D, Faust K, van Rienen U, Tietze A, Picht T, Herrington TM, Middlebrooks EH, Kühn A, Schneider GH, Horn A. Ann Neurol. 2022 May;91(5):613-628.

European Academy of Neurology/Movement Disorder Society-European Section Guideline on the Treatment of Parkinson's Disease: I. Invasive Therapies. Deuschl G, Antonini A, Costa J, Śmiłowska K, Berg D, Corvol JC, Fabbrini G, Ferreira J, Foltynie T, Mir P, Schrag A, Seppi K, Taba P, Ruzicka E, Selikhova M, Henschke N, Villanueva G, Moro E. Mov Disord. 2022 Jul;37(7):1360-1374. & Eur J Neurol. 2022 Sep;29(9):2580-2595.

Deep brain stimulation for Parkinson's disease. Hariz M, Blomstedt P. J Intern Med. 2022 Nov;292(5):764-778.

Results of a Randomized Clinical Trial of Speech after Early Neurostimulation in Parkinson's Disease. Pinto S, Nebel A, Rau J, Espesser R, Maillochon P, Niebuhr O, Krack P, Witjas T, Ghio A, Cuartero MC, Timmermann L, Schnitzler A, Hesekamp H, Meier N, Müllner J, Hälbig TD, Möller B, Paschen S, Paschen L, Volkmann J, Barbe MT, Fink GR, Becker J, Reker P, Kühn AA, Schneider GH, Fraix V, Seigneuret E, Kistner A, Rascol O, Brefel-Courbon C, Ory-Magne F, Hartmann CJ, Wojtecki L, Fradet A, Maltête D, Damier P, Le Dily S, Sixel-Döring F, Benecke P, Weiss D, Wächter T, Pinsker MO, Régis J, Thobois S, Polo G, Houeto JL, Hartmann A, Knudsen K, Vidailhet M, Schüpbach M, Deuschl G; EARLYSTIM Study Group. Mov Disord. 2022 Dec 3. doi: 10.1002/mds.29282. Online ahead of print.

Are Transventricular Approaches Associated With Increased Hemorrhage? A Comparative Study in a Series of 624 Deep Brain Stimulation Surgeries. Runge J, Nagel JM, Cassini Ascencao L, Blahak C, Kinfe TM, Schrader C, Wolf ME, Saryyeva A, Krauss JK. Oper Neurosurg (Hagerstown). 2022 Aug 1;23(2):e108-e113.

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Targeting Accuracy and Clinical Outcomes of Awake versus Asleep Interventional Magnetic Resonance Imaging-Guided Deep Brain Stimulation for Parkinson's Disease: The University of California, San Francisco Experience. Lee AT, Han KJ, Nichols N, Sudhakar VR, Burke JF, Wozny TA, Chung JE, Volz MM, Ostrem JL, Martin AJ, Larson PS, Starr PA, Wang DD. Neurosurgery. 2022 Nov 1;91(5):717-725.

Deep Brain Stimulation-Withdrawal Syndrome in Parkinson's Disease: Risk Factors and Pathophysiological Hypotheses of a Life-Threatening Emergency.

Grimaldi S, Eusebio A, Carron R, Regis JM, Velly L, Azulay JP, Witjas T. Neuromodulation. 2022 Nov 4:S1094-7159(22)01285-5. doi: 10.1016/j.neurom.2022.09.008. Online ahead of print.

The Effects of Deep Brain Stimulation in Patients with Multiple System Atrophy. Badihian N, Jackson LM, Klassen BT, Hassan A, Low PA, Singer W, Coon EA. J Parkinsons Dis. 2022 Nov 21.doi: 10.3233/JPD-223504. Online ahead of print.

Long-term motor outcomes of deep brain stimulation of the globus pallidus interna in Parkinson's disease patients: Five-year follow-up. Yun Su Hwang, Sungyang Jo, Seung Hyun Lee, Nayoung Kim, Mi-Sun Kim, Sang Ryong Jeon, Sun Ju Chung. Journal of the Neurological Sciences 444 (2023) 120484

Parkinsonism-Hyperpyrexia Syndrome: A Case Series and Literature Review. Azar J, Jaber Y, Ayyad M, Abu Alia W, Owda F, Sharabati H, Zeid H, Khreshi S, AlBandak M, Sayyed Ahmad D. Cureus. 2022 Sep 27;14(9):e29646. doi: 10.7759/cureus.29646.

Deep brain stimulation in dystonia: factors contributing to variability in outcome in short and long term follow-up. Tisch S. Curr Opin Neurol. 2022 Aug 1;35(4):510-517

Magnetic resonance-guided focused ultrasound for the treatment of tremor. Yamamoto K, Sarica C, Loh A, Vetkas A, Samuel N, Milano V, Zemmar A, Germann J, Cheyuo C, Boutet A, Elias GJ, Ito H, Taira T, Lozano AM. Expert Rev Neurother. 2022 Dec 5:1-13. doi: 10.1080/14737175.2022.2147826. Online ahead of print.

PSYCHIATRY (5 papers)

Tractography-based versus anatomical landmark-based targeting in vALIC deep brain stimulation for refractory obsessive-compulsive disorder. Graat I, Mocking RJT, Liebrand LC, van den Munckhof P, Bot M, Schuurman PR, Bergfeld IO, van Wingen G, Denys D. Mol Psychiatry. 2022 Sep 7. doi: 10.1038/s41380-022-01760-y. Online ahead of print.

Deep brain stimulation for obsessive-compulsive disorder: a crisis of access. Visser-Vandewalle V, Andrade P, Mosley PE, Greenberg BD, Schuurman R, McLaughlin NC, Voon V, Krack P, Foote KD, Mayberg HS, Figee M, Kopell BH, Polosan M, Joyce EM, Chabardes S, Matthews K, Baldermann JC, Tyagi H, Holtzheimer PE, Bervoets C, Hamani C, Karachi C, Denys D, Zrinzo L, Blomstedt P, Naesström M, Abosch A, Rasmussen S, Coenen VA, Schlaepfer TE, Dougherty DD, Domenech P, Silburn P, Giordano J, Lozano AM, Sheth SA, Coyne T, Kuhn J, Mallet L, Nuttin B, Hariz M, Okun MS. Nat Med. 2022 Aug;28(8):1529-1532.

Long-term comparative effectiveness of deep brain stimulation in severe obsessive-compulsive disorder. Mar-Barrutia L, Ibarrondo O, Mar J, Real E, Segalàs C, Bertolín S, Aparicio MA, Plans G, Menchón JM, Alonso P. Brain Stimul. 2022 Sep-Oct;15(5):1128-1138.

Deep brain stimulation in the ALIC-BNST region targeting the bed nucleus of stria terminalis in patients with obsessive-compulsive disorder: effects on cognition after 12 months. Philipson J, Naesstrom M, Johansson JD, Hariz M, Blomstedt P, Jahanshahi M. Acta Neurochir (Wien). 2022 Sep 2. doi: 10.1007/s00701-022-05351-2. Online ahead of print.

Deep brain stimulation versus ablative surgery for treatment-refractory obsessive-compulsive disorder: A meta-analysis. Hageman SB, van Rooijen G, Bergfeld IO, Schirmbeck F, de Koning P, Schuurman PR, Denys D. Acta Psychiatr Scand 2021 Apr;143(4):307-318.

MINIMALLY CONSCIOUS STATE (1 paper)

Clinical and neurophysiological effects of central thalamic deep brain stimulation in the minimally conscious state after severe brain injury. Arnts H, Tewarie P, van Erp WS, Overbeek BU, Stam CJ, Lavrijsen JCM, Booij J, Vandertop WP, Schuurman R, Hillebrand A, van den Munckhof P. Sci Rep. 2022 Jul 28;12(1):12932.

VARIA (4 papers)

Brain stimulation and elicited memories. Sjöberg RL. Acta Neurochir (Wien). 2022 Jul 8. doi: 10.1007/s00701-022-05307-6. Online ahead of print.

Serendipity and Observations in Functional Neurosurgery: From James Parkinson's Stroke to Hamani's & Lozano's Flashbacks. Hariz M, Lees AJ, Blomstedt Y, Blomstedt P. Stereotact Funct Neurosurg. 2022;100(4):201-209.

Shaken, not stirred: bioanalytical study of the antioxidant activities of martinis Trevithick CC, Chartrand MM, Wahlman J, Rahman F, Hirst M, Trevithick JR. BMJ. 1999 Dec;319(7225):1600-2. doi: 10.1136/bmj.319.7225.1600.

Désiré Bourneville: A Socialist in Charcot's Inner Circle. Coutinho L, Walusinski O, Teive HAG. Eur Neurol. 2022;85(1):79-84.

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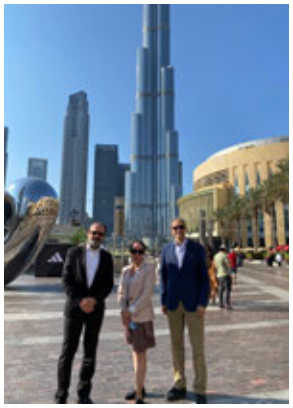
Functional Neurosurgery – Sharing Knowledge Together Again

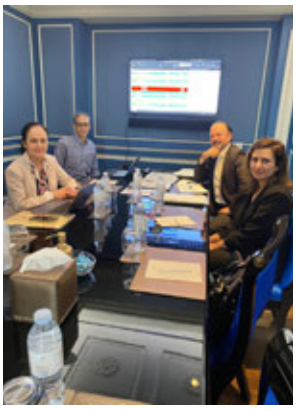
Dear colleagues,

It is a great privilege and honor to welcome all of you to the World Society of Stereotactic and Functional Neurosurgery Interim Meeting "Functional Neurosurgery – Sharing Knowledge Together Again" in the beautiful city of Dubai. This meeting will take place November 16-18, 2023 at the Mövenpick Grand Al-Bustan hotel. While it was the Society's intention to hold this conference in 2020, the COVID-19 pandemic forced its postponement. After patiently waiting for the multiple global waves to subside, it is now finally time to invite our international audience to Dubai.



The WSSFN organizing committee has created a unique program aimed at strengthening training and education in stereotactic and functional neurosurgery in the Middle East. International and regional faculty will share their expertise on a broad range of clinical topics and provide opportunities for reviewing the breadth of the field – from the fundamentals of stereotactic neurosurgery to new and emerging applications. Attendees will have opportunities for networking and abstract presentation.

The Society is thrilled to partner with regional sites to maximize the number of attendees by providing travel grants to trainees and junior faculty. Every effort has been made to ensure that attending this meeting is financially viable for all. The conference will be held over three days and will include lectures by experts in the field, panel discussions, as well as hands-on sessions. Attendees will learn from best practices, new strategies, and case studies while exploring ways to better serve their patient population. We encourage every participant to send an abstract, and join in the poster discussion sessions with an international audience.



The interim meeting will host the latest state-of-the-art exhibition facilities, including electronic posters and a dedicated app, which will allow participants the opportunity to review education material during the sessions and on their own time. Industry exhibits will provide delegates with the newest developments in the field through the exposure to different newly designed products and technologies.

And of course, this meeting will provide the great opportunity to meet with colleagues and friends globally and from the region. The multiple social events arranged will be instrumental for networking, meeting new colleagues or just catching up!

So please mark your calendars for the 2023 WSSFN Interim Meeting and visit our website at www.wssfn2023.com. We know that you will have a most enjoyable experience. See you in Dubai.

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President WSSFN

Mojgan Hodaie, MD
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Joachim K. Krauss, MD
Past President WSSFN,
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SAVE THE DATE - May & September

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