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WORLD FEDERATION OF NEUROLOGY

WORLD NEUROLOGY

THE OFFICIAL NEWSLETTER OF THE WORLD FEDERATION OF NEUROLOGY

PRESIDENT'S COLUMN

Changing of the Guard

A farewell message from the outgoing WFN president and a welcome message from the incoming president.

With this final President's Column for 2025, we will take a brief look back, update current activities, and finish with a peek into the future. This message is written by both the outgoing and incoming World Federation of Neurology (WFN) presidents to emphasize the need for continuity for the many WFN tasks and projects.

This continuity is important because the responsibilities of running the WFN include many ongoing activities and obligations. For example, the WFN has long-term committees that manage its congresses, Training Centers, and trainees. These committees also manage global activities with the World Health Organization (WHO) and the United Nations Economic and Social Council (U.N. ECOSOC), as well as WFN grants, and the ongoing input of our staff.

Message From Prof. Wolfgang Grisold

WOLFGANG GRISOLD

I joined the board of trustees at the 2009 World Congress of Neurology (WCN) in Thailand. Since then, I have held several positions, including trustee, secretary general-treasurer, and secretary general before serving as president from 2022 to 2025. My presidency was supported by the trustees, the committees, and the strong work of the WFN office staff.

During my tenure, many infrastructural issues were resolved, educational programs developed, and advocacy and leadership roles were added. We gained ground on global advocacy, including events such as World Brain Day and Brain Health as well as our joint work with the WHO and the U.N. The three stated goals on my application for the WFN presidency were communication, increasing the WFN's status, and innovation.

We have reached a higher level in our publications, including **journals**, social media, and **our website**. See the **WFN Essentials** page for more information on the federation and its offerings.

The incoming president, Dr. Steven Lewis, has been actively involved in the WFN for more than 11 years and has been the secretary general since 2022. In this position, he is not only involved in the day-to-day business of the WFN, but in all major decisions. He has a strong interest in education and has chaired the Education Committee since 2014. These experiences and prerequisites will help guarantee a smooth "change of guard."

Education

One of the important goals of the WFN — to promote education in Africa — was initiated by the late Prof. Johan Aarli. The next step was the implementation of the Training Centers and Department Visits in 2013. These Department Visits, education programs in Latin America, and initiation of education in Asia are ongoing WFN activities. These will need to be expanded, particularly in low-middle and low-income countries.

Training Centers and Department Visits are already standard procedures, but new concepts of teaching are needed. The core curriculum that was announced in 2022 and intended to be finalized within two years has stalled.

We wish to continue the successful **Global Advocacy Leadership Program** (GALP) created in partnership with the American Academy of Neurology (AAN). This program aims to promote advocacy and leadership for low-middle and low-income countries. In 2025, there were 15 graduates out of 100 applicants. This task is important, and it shows the commitment of the AAN and the WFN. However, it comes with high costs that must be adapted for future viability. Another consideration is that traveling visas have become more difficult to acquire in recent years.

Outgoing WFN President Prof. Wolfgang Grisold (left) and Incoming President Dr. Steven Lewis.

Global Activities

Neuro-politics has always been a WFN priority. Examples include the two editions of the WHO-WFN **Neurology Atlas** and WFN's role as a nonstate actor of the WHO. We have now picked up the topics of Brain Health and the **Intersectoral Global Action Plan** (IGAP), which is supported by the WFN. The WHO initiative is a welcome addition as it will help to implement neurology

see **PRESIDENT'S COLUMN** *page 2*

INSIDE

WORLD NEUROLOGY

WORLD NEUROLOGY, an official publication of the World Federation of Neurology, provides reports from the leadership of the WFN, its member societies, neurologists around the globe, and news from the cutting-edge of clinical neurology. Content for *World Neurology* is provided by the World Federation of Neurology and Ascend Media.

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FROM THE EDITORS

BY STEVEN L. LEWIS, MD, EDITOR, AND WALTER STRUHAL, MD, CO-EDITOR

STEVEN L. LEWIS, MD

WALTER STRUHAL, MD

Welcome to all readers from around the globe to the December 2025 issue of *World Neurology*, the final issue of this calendar year.

In the President's Column, Prof. Wolfgang Grisold, who completes his term as president of the World Federation of Neurology (WFN) at the end of this month, provides us with an overview of his remarkable and illustrious tenure with the association. He is passing the baton to the next president, Dr. Steven Lewis, who provides a brief preview of the next presidential term.

The editors would also like to extend our sincere gratitude to Prof. Guy Rouleau, who finishes his successful term as WFN vice president and leader of our WCN Congress Committee at the end of this month. His immense contributions to the WFN and our congresses position us well for the future.

In the History Column, Dr. Peter J. Koehler delves into the historical aspects of the nonmotor functions of the cerebellum. This issue also features news from Drs. Andreas Kattem Husøy, Yvonne Yiru Xu, and Timothy J. Steiner, who summarize the recent results from the Global Burden of Disease study. The study shows that headache disorders are a leading cause of health loss globally, with one-fifth being due to medication overuse.

This issue includes reports from Drs. Luis Querol and Camila Castelo Branco Pupe, on behalf of the Peripheral Nerve Society, highlighting global programs such as leprosy awareness, funding initiatives, and outreach opportunities.

Prof. Lawrence Tucker, president of the African Academy of Neurology, recounts a trip he and Prof. Grisold made to the University Training Hospital (UTH) in Lusaka, Zambia.

Dr. Rachel Forman, a stroke neurologist from Yale University, and two colleagues, provide information about a unique public school program intended to advance stroke education and community awareness. It is never too early to provide education and advocacy about brain health to the public. Connor McGinnis, a medical student from the United States, summarizes his experience rotating through the Neurology on Wheels initiative in rural India, led by Dr. Bindu Menon (and **previously highlighted** in *World Neurology*).

This issue also features an account from Dr. Cynthia Marleny Aliñado Ramos, a young neurologist from Guatemala. She recently successfully completed her one-year stroke fellowship at the high-level neurology institutions comprising the WFN-accredited Training Center in Mexico City. There is also a Junior Traveling Fellowship report from a young neurologist from Kyrgyzstan, who presented her research at the Asian and Oceanian Parkinson's Disease and Movement Disorders Congress.

This issue features additional photo highlights of activities of the recent World Congress of Neurology (WCN) in Seoul, South Korea. (See the **September-October 2025 issue** for additional photos.) The next WCN will be held in October 2027 in Cape Town, South Africa.

We say goodbye to two giants of international neurology who recently passed away: Prof. Mark Hallett (a previous editor of *World Neurology*) and Prof. Michel Dumas.

We again thank all neurologists and neurologic trainees from all regions of the world for your interest in the WFN and *World Neurology*.

In closing, we would like to once again acknowledge Prof. Wolfgang Grisold, for his untiring devotion to global neurology, the WFN, and brain health for all throughout his tenure as WFN president. •

PRESIDENT'S COLUMN

continued from page 1

care in many countries that are in need.

The WFN's engagement with the U.N. ECOSOC is still growing. Progress is being made in regard to noncommunicable diseases (NCDs). Bob Rae, past U.N. ECOSOC president and Canadian ambassador, sent a special message for World Brain Day 2025. I thank all participants of the office, all trustees, and everyone who continues to work on these important tasks. I especially want to thank Prof. Alla Guekht, past WFN trustee, and Ksenia Pochigaeva, WFN intern, who have contributed enormously to promoting these global contacts and activities.

World Brain Day is an effort to promote neurology worldwide for specific topics, but also for global brain health in general. Brain health has been selected by major regional societies, and a Lancet Commission on brain health has been established. These activities have been picked up and promoted by the WFN since 2012, and the issue of brain health appears in the WFN mission statement from that year.

Brain health was also used as an overarching topic for World Brain Day for the last four years. Topics for each year included:

- Brain Health (2022)
- Brain Health and Disability (2023)
- Brain Health Prevention (2024)
- Brain Health for All Ages (2025)

The 2025 World Brain Day was successful and helped grow the impact of the project worldwide. However, I believe the importance of disability and all tasks involved in managing disability still have not been sufficiently explored for individual neurological disease entities.

Another important event for neurology is the **International Congress on Neuromuscular Diseases** (ICNMD). The congress, which will be held annually beginning in 2027, provides a wide range of education and discussion on the neuromuscular system. This includes motor neurons, neuropathies, neuromuscular transmission, and muscle diseases. The next meeting will be July 7-11 in Florence, Italy.

Publications

Publications and promotions are an important part of the WFN. The most impactful tool we have is *World Neurology*, edited by Dr. Steven Lewis and Dr. Walter Struhal. With a readership of about 25,000, it is an efficient tool to relay news. We also have a **WFN service page** appearing quarterly in the *Journal of the Neurological Sciences (JNS)*. This page gives an extended view on select topics as well as articles from invited contributors.

The *JNS* is the flagship of our publications. It has earned a good impact factor and also creates revenue that allows the WFN to proceed with its manifold activities. I must thank Prof. John England and his team for their constant devotion to this journal. The *eNeurological Sci (eNS)*, edited by Dr. Struhal, is gaining importance.

Congresses

WFN congresses, including the **World Congress of Neurology**, are important events for presenting educational programs and excellent lectures. They also feature new initiatives such as interactive sessions, coffee talks, and political sessions. Yet things are changing worldwide, and regional congresses, such as AAN and European Academy of Neurology (EAN) will only survive by holding large events.

The excellent programming and the important regional interest of the pharmaceutical industry attracts many constant sponsors. However, the WFN has witnessed a steady decline in participants. The successful hybrid component of Montreal in 2023 was not as successful in Seoul in 2025. Virtual attendance dwindled to 20%, with little interest from low-middle and low-income countries.

This means that the concept of regional congresses needs to be rethought. Smaller congresses might not survive due to structure and costs. Excessive costs

see **PRESIDENT'S COLUMN** *page 3*

PRESIDENT'S COLUMN

continued from page 2

come from travel, visas, and congress venues. The expenses of congress halls and additional aspects such as food and beverages are climbing to excessive amounts. The pharmaceutical industry does not seem interested in worldwide rotating meetings and prefers local sponsorship for their secured markets.

For the prior two WCNs — Montreal and Seoul — WFN has not gained any of the surplus funding that is needed to cover the excessive expense for the maintenance of the society and for all future projects. The WFN will need to rethink not only the timing, sequence, and regions, but also the structure and duration of future congresses.

Thanks to savings and economizing procedures, the total wealth of the WFN remained stable until the end of 2024. This will likely change in 2025 when the additional costs of the WCN will show. To sustain WFN activities, the trustees are evaluating international funding projects, which could fund some of our educational activities. This funding will apply not only to the present state but also expansion and increased services. This funding is prepared with great care, and we hope to be able to start the process in 2026.

Final Thoughts From Prof. Grisold

Interviews often end with the question, "What would you do if … ?" My answer typically is, "I would like to work miracles. However, miracles are miracles, and we have to work with what we have in the present situation."

We are glad that we were able to maintain the high standards of the WFN that were achieved by my predecessors. We promoted and expanded educational activities, global advocacy and leadership efforts, and brought attention to brain health with World Brain Day.

I would like to leave you with these suggestions for the future of the WFN:

- Increase the pace of education and the number of training positions in Africa, Latin America, and the Pan-Arab region. Some of these need the full attention of the WFN.
- Look into professionalized funding and make funding an important synergy of the WFN while still remaining independent. This will help to invest further in educational projects. At the top of my list would be primary care, education and neurology, students, residents, and more CME programs.
- Rethink granting. If funds are available, this means that we need to expand from limited educational grants to scientific projects and grants that could be sponsored by the WFN.
- Seek a high impact factor on all official WFN publications.
- Promote young neurologists, appoint WFN neurology interns, and proceed with gender and equity efforts.

As past president, why did I not do all of these things during my tenure? The answer is, many things have been initiated and are ready to proceed. Continuity will show what more can be achieved. We look for the continuation of the independence of the WFN.

My final thought: My wish is for the end of war in all parts of the world. As we can see on Wikipedia, the number of armed conflicts is endless, and we usually only see what is happening either in our neighborhood or promoted by the press. Nevertheless, the neurological damage inflicted on all participants — those in combat and those in civilian society — is immense. The damage includes mental illness, neurologic diseases, and brain, spinal cord, peripheral nerve, and muscle injuries. It is my explicit wish that the WFN engage in help for victims of war and put many of these efforts on record as scientific evidence. •

Message From Incoming President Dr. Steven Lewis

STEVEN L. LEWIS, MD

Thank you to Prof. Wolfgang Grisold for the opportunity to introduce myself and briefly summarize my thoughts before he passes the torch to me Jan. 1, 2026.

I want to thank the WFN Council of Delegates for electing me to the role of WFN president. I also want to express my gratitude to Prof. Grisold for being such an effective leader as well as a mentor to me during his presidency. I thank him for the opportunity to work so closely with him and participate in many of the important discussions and decisions that have moved the WFN forward these past years. His remarkable devotion to the WFN and our member societies as well as his 24/7 indefatigability have inspired me and so many others who have had the privilege of working with him.

I also wish to extend my sincere appreciation and acknowledgement to Prof. William Carroll and Prof. Raad Shakir, previous WFN presidents, under whom I have been privileged to serve, and from whom I have learned so much. This is especially true with regard to their leadership skills, institutional knowledge, and wise counsel. Although I joined the WFN after Prof. Vladimir Hachinski's tenure, I was privileged to have had many memorable interactions with him. In summary, I will be standing on the "shoulders of giants" as I begin this important role.

As I enter the WFN presidency, I pledge to continue and expand upon the work of Prof. Grisold and his predecessors with regard to neurologic education and training, global advocacy endeavors and partnerships (including our work with the WHO and the U.N. ECOSOC), publications, and our many other ongoing, growing, and novel activities. In performing this work, I will be a careful steward of the WFN's finite financial and human resources and appropriately support our outstanding, hard-working, and highly qualified staff in our secretariat in London.

"As I enter the WFN presidency, I pledge to continue and expand upon the work of Prof. Grisold and his predecessors with regard to neurologic education and training, global advocacy endeavors and partnerships..."

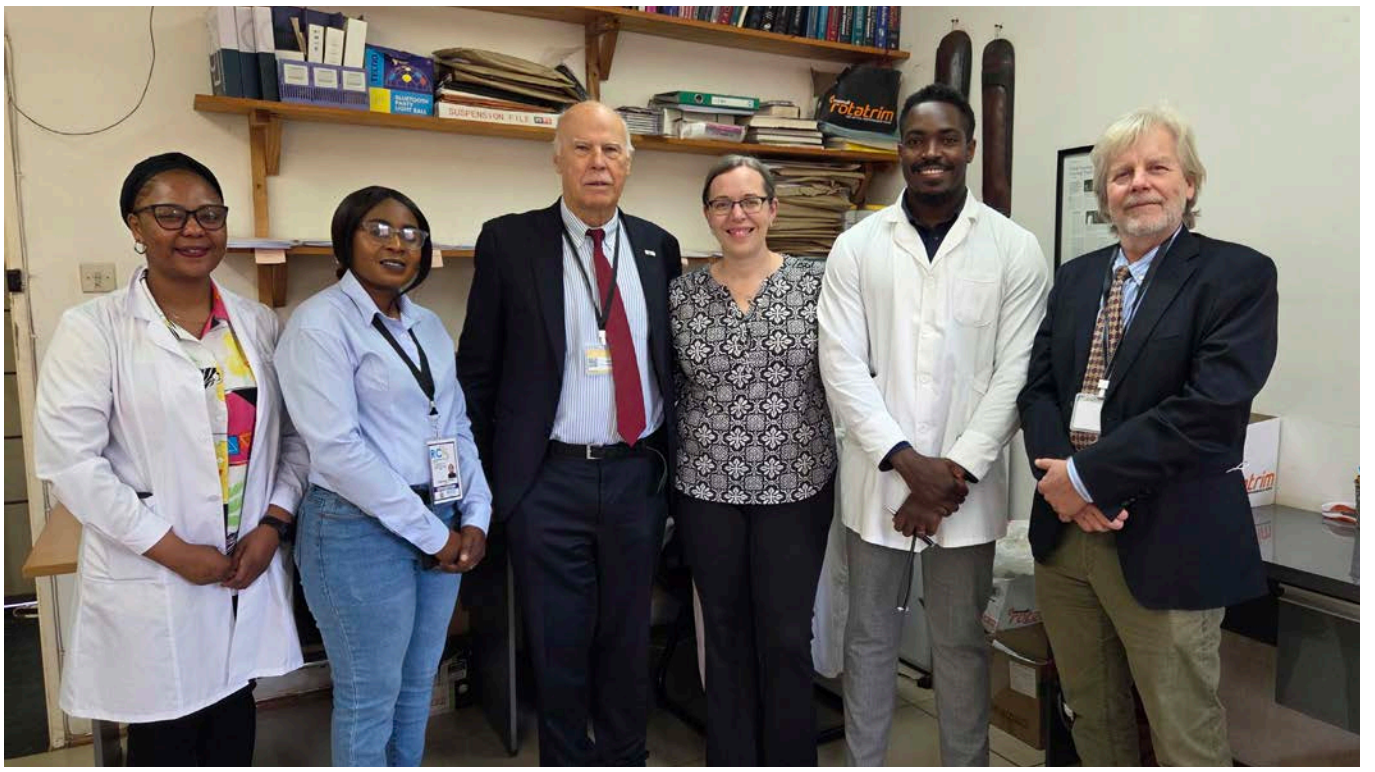
Collaborating with our six regional organizations and now 126 member societies, and in our specialty groups and committees, I will always keep equity (fairness), inclusion, and diversity at the top of mind. I will recognize important variations of opinion as all of us, as stakeholders, work to achieve our common goals of optimal brain health and access to the highest quality of neurology and neurological care globally.

I look forward to sharing more of my vision in the President's Column in the first *World Neurology* issue of the New Year. •

University Training Hospital in Lusaka, Zambia

On-site visit reveals the progress of neurological training in Africa and the continuing need for more.

BY PROF. LAWRENCE TUCKER



WFN outgoing President Wolfgang Grisold (3rd from left) and AFAN President Lawrence Tucker (right) visit with staff at the University Teaching Hospital in Lusaka, Zambia.

The University Teaching Hospital (UTH) in Lusaka is the largest public tertiary hospital in Zambia. It is also the main institution training center for health care professionals and includes the country's only neurology training center.

There are currently 21 neurologists in Zambia, which has an estimated population of 21 million people. Most of those 21 neurologists were trained at the UTH.

The UTH neurology training center was established in 2018 and currently graduates approximately three neurologists per year. Prior to 2018, there were only one or two neurologists in the entire country. The center trains both adult and pediatric neurologists. The establishment of this training program was led by Prof. Deanna Saylor and is supported by the Johns Hopkins Global Neurology Program.

In August, World Federation of Neurology (WFN) outgoing President Prof. Wolfgang Grisold and African Federation of Neurology (AFAN) President Prof. Lawrence Tucker visited the training center. There, they met with Prof. Saylor and several other consultants and neurology residents. They were shown around the neurology wards and neurophysiology laboratory.

During a second visit, Prof. Tucker joined a consultant-led ward round of neurology in-patients. Later, he discussed the status of Zambian neurology with members of the neurology department.

According to Dr. Stanley Zimba, a senior neurology consultant, stroke, epilepsy, primary headache disorders, and neuroinfectious diseases such as tuberculosis, various meningitides, and malaria contribute most to the neurological disease in Zambia. Central nervous system neuroinflammatory conditions, including both neuromyelitis optica spectrum disorder (NMO) and multiple sclerosis (MS), are relatively common, as are neurodegenerative diseases, especially Parkinson's disease and dementia.

Virtually all neuroscience research in Zambia is performed at the neurology facility at UTH. Dr. Zimba confirmed that this research work has assisted in establishing the evidence-based clinical practice. This practice is being extended across the country as more neurologists graduate from the program and are appointed to state-funded neurology posts in other Zambian towns and cities.

The greatest threats to brain health in Zambia, according to Dr. Zimba, are the lack of funding to enhance neurological care, the paucity of structured programs for prevention, and limited access to treatment options for many common neurological conditions.

CT and MRI scanning facilities are available at UTC, and the neurology division has facilities to perform electroencephalograms (EEG), electromyography (EMG), and nerve conduction studies (NCS). However, access is limited by high demand and, consequently, wait times are typically long. Many patients must pay for their scans if their conditions are assessed as not being emergencies.

Although a free universal state-funded point-of-care system is available for emergencies, there is limited state funding available for nonurgent neurology (and other) health care delivery. Private health insurance is available to Zambians with financial means. Affluent patients often seek neurological investigation and treatment in South Africa or abroad.

In the short term, Dr. Zimba expects an uptick in the incidence of HIV, stroke, and epilepsy. In the longer term, he predicts these diseases will contribute increasingly to the burden of neurological disease in his country as the burden of noncommunicable disease increases consequent to progressive aging and urbanization of the Zambian population.

Our impression was that the Zambian neurology training program at UTC is well run, effective, and produces neurologists who are highly competent in managing neurological disease in a resource-constrained environment. •

Lawrence Tucker is president of African Academy of Neurology, a member of the WFN Education Committee, and served as a member of the WFN delegation to the 2025 meeting of the WHO Regional Committee for Africa.

2026 PNS Training Grants Program

Funding opportunities and outreach initiatives are available for junior investigators.

BY LUIS QUEROL, PHD

LUIS QUERO

The Peripheral Nerve Society (PNS) continues its long-standing tradition of fostering the next generation of researchers and clinicians dedicated to tackling peripheral nerve disorders. This commitment is exemplified by the PNS Training Grants Program, which has recently been named in honor of Prof. Laura Feltri. This recognizes her outstanding scientific legacy and her unwavering dedication to mentoring young investigators in the field. The PNS Laura Feltri Training Grants Program aligns with the PNS's mission to "advance knowledge and improve the lives of people with peripheral neuropathies."

Designed to support early career researchers with advanced training, the program typically lasts two years at a host institution. The host institution may now be the same as, or different from, the candidate's training institution. The overarching goal is to expand expertise, promote vital international collaboration, and strengthen the entire field of peripheral nerve research across its clinical, translational, and basic science domains.

Six trainees from different parts of the world have been awarded PNS Training Grants to develop projects, including clinical, translational, and basic peripheral nerve science projects.

For the 2026 call, the PNS is boosting its investment, with plans to fund up to three trainees per year with a generous award of $75,000 annually for two years. Applicants have two distinct profiles from which to choose. They are:

- **Junior Clinical Investigators**: Ideal for those seeking to gain or consolidate expertise in areas like clinical observational studies, outcome measures, diagnostic methods, or therapeutic development related to peripheral neuropathies.
- **Junior Scientists or Clinician-Scientists**: Aimed at developing advanced knowledge in Schwann cell and axonal biology or disease pathomechanisms through laboratory or translational research.

Eligible candidates must demonstrate a clear commitment to peripheral nerve research and hold an MD, PhD, or MD/PhD (or equivalent). Individuals expecting to defend their doctoral thesis within one year of application are also eligible. Candidates must identify a qualified mentor with an established track record in peripheral nerve research. Both the mentor and the trainee must be, or must become, PNS members.

PNS President Charlotte Sumner, MD (center), with the 2025 PNS Training Grants recipients Erva Bayraktar, PhD (left), and Katherine Lewis, PhD.

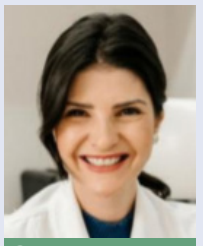
The society enthusiastically encourages applications from all motivated junior researchers, clinicians, neuroscientists, and basic scientists who aspire to build a career in this vital field and contribute to the vibrant, global PNS community.

Find detailed information, application requirements, and deadlines on the **PNS website**. •

Leprosy Awareness Podcast Series

Raising awareness to mitigate the spread and transmission of leprosy neuropathy.

BY CAMILA CASTELO BRANCO PUPE, PHD



CAMILA CASTELO BRANCO PUPE

Leprosy is one of humanity's oldest diseases. Yet, it is still a frequent cause of peripheral neuropathy worldwide, especially in certain endemic areas.

Although leprosy is a treatable and curable disease, it remains prevalent in several regions of the world due to the underdiagnosis of new cases, which sustains transmission within communities. The disease is complex and sometimes difficult to recognize, especially in its pure neuritic forms.

Even though leprosy is primarily a neurological condition, it has historically received little attention from neurologists. This has resulted in delays in diagnosis and management. Effective control depends on training clinicians to identify early neurological signs and initiate prompt treatment, preventing disability, and interrupting transmission chains.

The first step toward this goal is raising awareness — ensuring that every neurologist recognizes leprosy as a disease of the peripheral nerves that can and should be cured.

To shed light on this reality, the Peripheral Nerve Society (PNS) launched the Leprosy Awareness Podcast Series, an educational project that brings science and clinical practice together. It is designed to connect clinicians, researchers, and students worldwide. It was one of the most successful PNS initiatives of 2025 — an international collaboration highlighting advances in the understanding, diagnosis, and management of leprosy neuropathy.

Led by Dr. Camila Castelo Branco Pupe (Brazil) and Prof. Wilson Marques Jr. (Brazil), the series includes experts from India, Brazil, Switzerland, the Netherlands, and the United States. These guests share scientific updates and lived experiences from both endemic and nonendemic regions.

Each episode explores a different facet of the disease, blending scientific discussion with real-world experience.

These facets include Schwann cell biology, clinical recognition, neurophysiology, imaging, treatment, and rehabilitation, while reminding listeners that leprosy is a disease of nerves, not just of skin. The conversations also highlight stigma, inclusion, and clinical cases showing the human stories behind medical care.

Supported by the PNS International Outreach and Membership Committee, the project aims to bridge different cultures and generations, connecting neurologists, dermatologists, immunologists, trainees, experienced peripheral neuropathy specialists, and other professionals through accessible and story-driven education.

The series has already reached listeners in more than 60 countries, amplifying awareness where it is most needed. Episodes are being released throughout the year and continue to inspire global collaboration in peripheral nerve health and neglected diseases.

Listen now on **Spotify**, **Apple Podcasts**, **iHeartRadio**, or at **the Peripheral Nerve Podcast website**. •

Empowering Children to Recognize Stroke Symptoms

Public school program advances stroke education and community awareness.

BY RACHEL FORMAN, KALLIOPI TSAKPOUNIDOU, AND MICHAEL RAFFERTY

A collaboration in Derby, Connecticut, is bringing together Yale School of Medicine, Griffin Hospital, and Derby Public Schools with the **FAST Heroes** program to strengthen stroke awareness across the community.

The initiative uses the FAST Heroes curriculum, an interactive stroke educational program based on the FAST stroke recognition acronym: Face, Arm, Speech, Time. It was developed at the University of Macedonia in Greece. The curriculum is supported by the **Angels Initiative**, a health care intervention program dedicated to improving stroke survival. It was developed by pharmaceutical company Boehringer Ingelheim.

The Angels Initiative is aimed at equipping school children with the ability to identify stroke symptoms promptly and act appropriately in case of suspected stroke (for example, calling an emergency number for an ambulance).

Using storytelling, animated characters, and family-oriented activities, the program is being implemented in both of Derby's elementary schools, empowering children to recognize the signs of stroke and to share this knowledge at home. Early feedback from teachers in Derby suggests high student enthusiasm and meaningful conversations occurring within families, expanding the program's reach beyond the classroom.

To date, more than one million children have been educated through the FAST Heroes program globally. **Many lives have been saved** around the world thanks to the preparedness of children who have participated in the program.

With this educational effort, Griffin Hospital in Derby is collecting data on stroke knowledge and response behaviors among patients admitted with stroke. The goal is to better understand how school-based interventions may influence real-world outcomes, including EMS activation and time to treatment. Dr. Rachel Forman, a Yale stroke neurologist, is providing academic and clinical guidance and helping to ensure the initiative's educational and research components are aligned.

Together, these partners are building a community-centered model that links health education, clinical data, and family engagement, offering a promising approach for improving stroke preparedness in similar communities. •

RACHEL FORMAN

KALLIOPI TSAKPOUNIDOU

MICHAEL RAFFERTY

Rachel Forman is an assistant professor of neurology at Yale School of Medicine in New Haven, Connecticut. **Kalliopi Tsakpounidou** is a post-doctoral researcher and secondary special education teacher in the Department of Educational and Social Policy at the University of Macedonia in Greece. **Michael Rafferty** is the director of teaching and learning at Derby Public Schools in Derby, Connecticut.

IN MEMORIAM

Prof. Mark Hallett, MD (1943-2025)

A legacy of science, service, and humanity that helped shape modern neurology.

BY PROF. TISSA WIJERATNE

The global neurology community mourns the loss of Prof. Mark Hallett, MD, whose passing in 2025 marks the end of an era in movement disorders and motor control research. Born in 1943, Prof. Hallett became one of the most influential neurologists of his generation, shaping both the science and spirit of modern neurology.

Prof. Hallett's academic journey, which began at Harvard Medical School, progressed through his formative years in London and culminated in his decades of leadership at the National Institute of Neurological Disorders and Stroke (NINDS), reflects an unwavering commitment to scientific discovery. As chief of the NINDS Human Motor Control Section, he laid much of the foundation for how we currently understand dystonia, tremor, functional movement disorders, and the physiology of voluntary movement.

Beyond his scientific achievements, Prof. Hallett was a true citizen of world neurology. He served as president of the International Parkinson and Movement Disorder Society, vice president of the American Academy of Neurology, and editor-in-chief of *World Neurology*, where his vision strengthened global dialogue and collaboration. His leadership helped build durable bridges across continents, particularly with Asia-Oceania and Australia, regions he supported with genuine respect and enthusiasm.

For many of us who met him as young neurologists, Prof. Hallett embodied mentorship at its best: generous with his time, patient in his guidance, and sincerely invested in our success. I remember countless conversations with him at the World Congress of Neurology (WCN) and Movement Disorder Society (MDS) meetings, moments of quiet encouragement that stayed with me. In our most recent discussion, he spoke warmly about visiting Sri Lanka, a journey he was looking forward to. Sadly, this visit will remain unrealized.

During the height of the COVID-19 crisis, I had the privilege of conducting an extended, hour-long discussion with Prof. Hallett via Zoom. We explored his scientific journey, his views on mentorship, his reflections as past editor-in-chief of *World Neurology*, and his hopes for the future of our discipline. **This conversation** now stands as a precious historical record of his voice, his warmth, and his vision for global neurology.

Prof. Hallett leaves a profound legacy: rigorous science, global leadership, and a rare human warmth that shaped generations. The World Federation of Neurology extends our deepest condolences to his family, friends, and colleagues around the world. His impact will endure in every clinic, laboratory, and community touched by his work. •

Prof. Tissa Wijeratne, OAM, MD, PhD, FRACP, is a trustee of the World Federation of Neurology.

Prof. Mark Hallett (center) receives the WFN Award for Contribution to Neurological Science at the XXIV World Congress of Neurology in Dubai. He is flanked by World Federation of Neurology President William Carroll (left) and American Academy of Neurology President James Stevens.

IN MEMORIAM

Prof. Michel Dumas, MD (1934-2025)

Award-winning neurologist created the Institute of Epidemiology and Tropical Neurology.

BY PIERRE-MARIE PREUX AND AMADOU GALLO DIOP

We are deeply saddened to announce the passing of Prof. Michel Dumas, who died Nov. 8, 2025, in Limoges, France.

After having contributed to the establishment of the first Francophone Departments of Neurology in West and Central Africa and trained the first professors and teams — thereby helping to bridge major human resources gaps in sub-Saharan Africa — Prof. Dumas joined the Faculty of Medicine at University Hospital of Limoges, France, in 1976. He founded and chaired the Department of Neurology until 2000 and served as vice dean from 1980 to 1990.

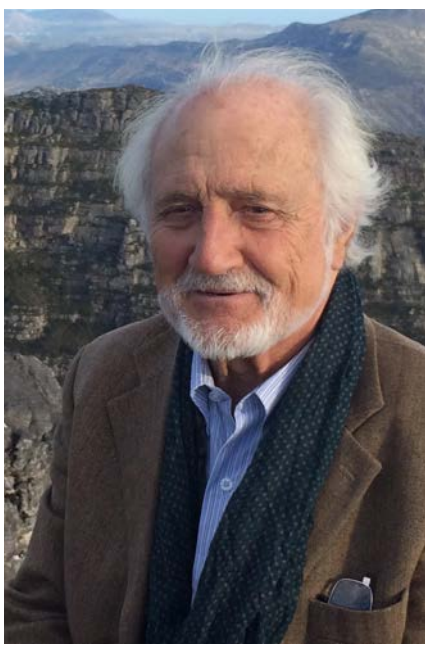
In 1982, he created the Institute of Epidemiology and Tropical Neurology (IENT), which rapidly garnered international recognition for its pioneering research and training on neurological disorders in tropical and low-resource settings. Under his leadership, Limoges became a vibrant hub for the training of neurologists and public health specialists from Africa, Southeast Asia, and Latin America.

A devoted advocate of international cooperation, he established long-standing partnerships with institutions across continents and inspired generations of neurologists and researchers to build bridges between clinical practice, public health, and social responsibility.

In recognition of his outstanding contributions to international neurology, Prof. Dumas received the Services to International Neurology Award from the World Federation of Neurology (WFN) in 2015. He was also a corresponding member of the French National Academy of Medicine.

The institute he founded now bears his name: the Michel Dumas Institute for Epidemiology and Global Health. It is a living legacy of his vision, commitment, and humanity. His influence endures through the countless students, colleagues, and institutions he inspired worldwide. •

Pierre-Marie Preux, MD, PhD, is chair of the WFN Neuroepidemiology Specialty Group and director of the Michel Dumas Institute for Epidemiology and Global Health at the University of Limoges. **Amadou Gallo Diop, MD, PhD**, is a past trustee of the WFN and a member of the Senegal National Academy of Sciences. He is also past chair of the Department of Neurosciences at the University of Dakar.



WFN
WORLD FEDERATION OF NEUROLOGY

Insights Into Headache Disorders

Migraine and medication overuse continue to be leading causes of years lived with disability globally.

BY ANDREAS KATTEM HUSØY, YVONNE YIRU XU, AND TIMOTHY J. STEINER

The Global Burden of Disease (GBD) report, the most comprehensive study of death and health loss globally,[1] probably needs no introduction to most readers. New estimates for the entire series (from 1990 onward) are published every two years. The standardized method, including calculation of years lived with disability (YLD), allows for a comparison of the burden between disorders.[1]

Migraine Most Burdensome

Nearly 3 billion people worldwide suffer from one or more headache disorders,[2] according to the **GBD's latest report**, which was published Oct. 12, 2025. Migraine, tension-type headache (TTH) and medication-overuse headache (MOH) accounted for 4.6% of the world's total YLD count, making them the sixth leading cause of health loss globally.[2] About 90% of this health loss was attributed to migraine, even though TTH was estimated to be nearly twice as prevalent.

All neurological disorders together accounted for 7% of total YLD,[3] with two-thirds of this attributed to headache disorders. Migraine ranked first among all neurological disorders by a large margin.

That headache disorders, and in particular migraine, are among the most burdensome of neurological disorders is not news. But the GBD report again demonstrated that the age-standardized health loss attributed to headache disorders has remained unchanged since 1990.[2] The total global burden has increased in line with population expansion and fluctuations in age distribution. Whatever health services are in place for headache disorders, they are having no measurable effect. This is not for lack of effective treatments. Triptans, for example, have been available since 1991, and there are several preventative drugs with proven efficacy.

Increased Gender Gap

A new insight emerging from the GBD report, made possible through modeling refinements, is the gender gap in headache-attributed health loss is larger than previously estimated.[2] Females carry more than twice the burden of males, owing not only to a higher prevalence of migraine among females but also to females having higher frequency and longer duration headache episodes than their male counterparts.[2]

This insight came as the result of a meta-analysis of individual participant data from 41,653 people from 18 countries[2] gathered (mostly from unannounced visits to randomly selected households) in population-based studies carried out by the Global Campaign Against Headache.[4] Although the overall estimate for the two genders combined did not change by much, the importance of this realization lies in the more precise depiction of the global headache burden and whom it affects.

Medication Overuse

A second insight emerging from the GBD report is of profound importance clinically to health policy and to public health education: More than one-fifth of the global health loss caused by headache disorders in 2023 was attributed to MOH, and therefore to mistreatment in the form of medication overuse. This finding is buried in the original data. Since the 2016 iteration, the GBD report has viewed MOH as a sequela either of migraine or TTH, and reattributed its burden in proportions to these disorders (almost three-quarters to migraine, in accordance with a meta-analysis of three studies).[2]

The profundity of this insight lies in the realization that a substantial portion of the global headache burden is treatable, or even preventable, by means that should not require investment in health services. Discouraging overuse of acute medication requires education rather than heath care. Governments with an interest in reducing health loss and the associated productivity losses should be the first to recognize this and promote public awareness. Physicians, whether in primary care or headache specialists, also need to be aware of this.


ANDREAS KATTEM HUSØY


YVONNE YIRU XU


TIMOTHY J. STEINER

Andreas Kattem Husøy is a postdoctoral fellow in the Department of Neuromedicine and Movement Science at the Norwegian University of Science and Technology and a physician at the Norwegian Center for Headache Research (NorHead), both in Trondheim, Norway. **Yvonne Yiru Xu** is a researcher with the Institute for Health Metrics and Evaluation at the University of Washington in Seattle. **Timothy J. Steiner** is an academic physician and specialist in headache medicine with NorHead, a professor in the Department of Neurology at the University of Copenhagen in Copenhagen, and a professor in the Division of Brain Sciences at Imperial College London.

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WFN TRAINING CENTER REPORT

Stroke Visiting Fellowship Program in Mexico

A fellow reports on experience with stroke care, Doppler ultrasonography, neuroimaging interpretation, and more.

BY CYNTHIA MARLENY ALIÑADO RAMOS

I am honored to present the final report of my participation in the **One-Year Stroke Visiting Fellow Program**. My visit took place from September 2024 to August 2025 in Mexico.

I had the privilege of rotating at the General Hospital of Mexico Dr. Eduardo Liceaga (HGM), the National Institute of Medical Sciences and Nutrition Salvador Zubirán (INCMNSZ), and the National Institute of Neurology and Neurosurgery Manuel Velasco Suárez (INNNMVS). Each of these institutions contributed in different ways to my training in vascular neurology, providing a comprehensive and highly enriching experience.

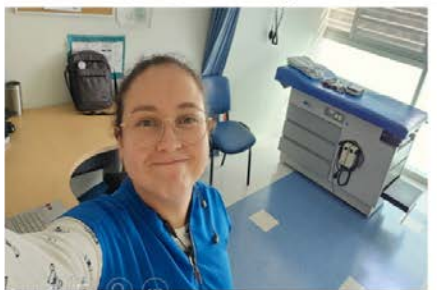
At the HGM, I acquired competencies in the outpatient care of patients with cerebrovascular disease, the performance and interpretation of Doppler ultrasonography, and the critical review of scientific literature. Teaching emphasized neurological examination, neuroimaging interpretation, and the implementation of the stroke code with validated screening scales.

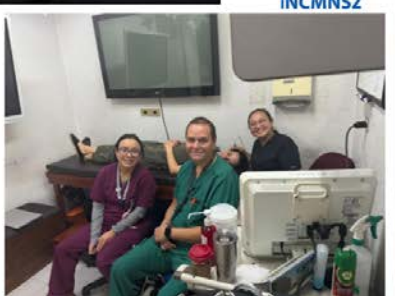
At the INCMNSZ, I reinforced the use of standardized Doppler protocols, participated in specialized outpatient clinics, and engaged in academic activities of great depth. I also integrated into the multidisciplinary management of acute stroke, including clinical discussions and case analysis sessions.

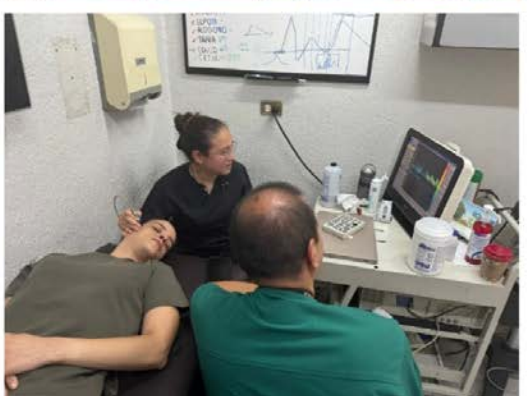
The INNNMVS constituted the academic core of the fellowship, integrating and consolidating previous learning within an environment of excellence in teaching, research, and teamwork. From the outset, I was fully incorporated into the group, with active participation in literature reviews, guideline discussions, interdisciplinary ward rounds, therapeutic planning, and research projects. Complementary rotations broadened my clinical perspective, making this stage the culmination of the program and an experience of great professional and human value.

This fellowship has had a profound impact on my professional practice. I learned advanced skills in Doppler ultrasonography, strengthened my ability in comprehensive and multidisciplinary stroke management, and refined the critical application of scientific evidence. The knowledge I acquired will translate into the strengthening of the stroke code in Guatemala, the training of multidisciplinary teams, and the development of applied clinical research in my context.

I am especially grateful to the World Federation of Neurology (WFN), the Mexican Academy of Neurology (MAN), and my professors and mentors for this invaluable opportunity, which not only enriched my clinical and academic competencies but also reaffirmed my commitment to improving stroke care in my country. •







Cynthia Marleny Aliñado Ramos is a young neurologist in Guatemala.

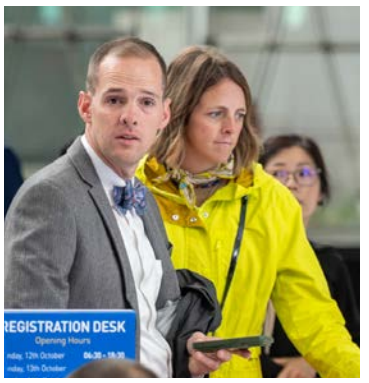
WCN 2025 IN PICTURES

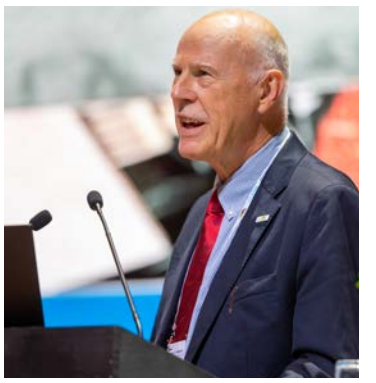
The World Congress of Neurology in Seoul, South Korea, featured networking opportunities, exciting educational sessions, entertainment, and many changes for the World Federation of Neurology, including election of a new president and vice-president. Here we present more highlights from this year's event.

DAY 1









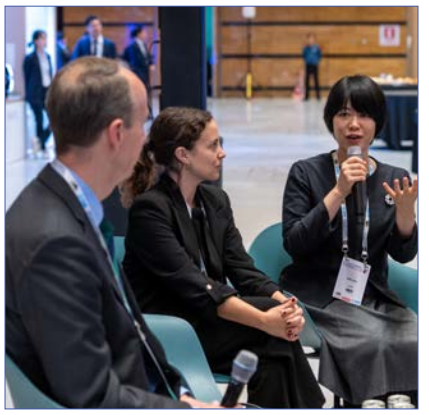





WCN 2025 IN PICTURES








DAY 2






WCN 2025 IN PICTURES




DAYS 3 & 4








HISTORY

Evolving Viewpoints on the Cerebellum

Historical aspects of cerebellar nonmotor functions have changed over time.

BY PETER J. KOEHLER

With respect to the history of functions successively attributed to it, the cerebellum is perhaps one of the most remarkable parts of the central nervous system. Five years ago, I wrote about vital functions attributed to the cerebellum ("**Early Ideas on the Localization of Vital Functions: From Cerebellum to Medulla Oblongata**," *World Neurology*, Winter 2019). This was particularly true in the 17th and 18th centuries when it was initially thought that the cerebellum was a vital organ. More careful experiments gradually revealed that this was not the case. The ideas regarding nonmotor functions of the cerebellum, however, are more numerous than that.

Memory

In classical antiquity, the *pneuma psychikon*, a supposed volatile substance that was transmitted from the cerebral ventricles to the nerves, was considered the instrument of the soul. In the early medieval period, the cerebral ventricles (called "cells" rather than the cerebral substance) were considered important. Nemesius of Emesa (c. 390) connected Greek physiology with Christian concepts and localized the psychic pneuma in these hollow spaces in the head. (See Figure 1.) The localization was as follows:

- **First cell**: Imagination (the present lateral ventricles)
- **Second cell**: Thought (now third ventricle)
- **Third cell**: Memory (the present fourth ventricle, below the cerebellum)

In this way, "the balanced conception of human nature inherited from the Greeks was gradually eroded as Christianization of the ancient world advanced, with most of the attention being now focused only on the soul."[1] The material seat of the divine spirit and *sensorium commune* (the place where the information from all the senses converges) were localized as follows:

- **First cell**: *Phantasia, sensus communis*, and *imaginativa*
- **Second cell**: *Mogitati[v]a and estimatia*
- **Third cell**: *Memorativa*

Memory was still localized at the back of the head by Nicolaes Tulp (1593-1674; see Figure 2), who described two cases of memory loss in his *Observationes Medicae* of 1641.[2] In the first case, a person fell on one of Amsterdam's slippery bridges, hitting the back of their head and suffering severe memory loss with only partial recovery. In the second case, a person was found with a wound to the back of the head and did not know what had happened.

A Musical Ear

The Italian physician and anatomist Costanzo Variolo (1543-1575) associated the cerebellum with movement, but also with hearing, taste, and touch, as he believed some cranial nerves had their origin there. As written in the *World Neurology* **article** mentioned above, the cerebellum was attributed a vital function due to observations of severe occipital injuries. Moreover, several 17th century experimenters reported the fatal effect of the removal of the cerebellum.

Thomas Willis (1721-1775) believed the vagus nerve had its origin in the cerebellum and therefore played a role in breathing, heartbeat, bowel movement, etc. However, he also associated the cerebellum with the musical faculty.

"Audible sounds pass through the cerebellum, they leave behind some traces of their passage in certain men who live in this country … they are endowed with a musical ear."[3]

During the subsequent century, several experimenters observed that animals did not always die upon removal of the cerebellum, if more precise and careful experiments were conducted.

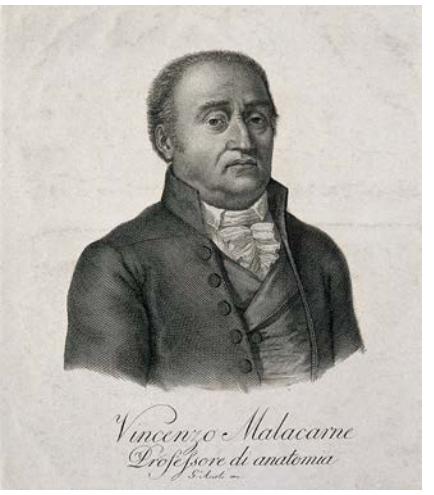


Figure 3. Vicenzo Malacarne (public domain © Wellcome Collection, London).

Figure 4. Franz Joseph Gall. Lithograph by A. F. Kunike (public domain © Wellcome Collection, London).

Intelligence

The Italian surgeon and anatomist Vincenzo Malacarne (1744-1816; see Figure 3), who introduced terms for several cerebellar parts including tonsil, pyramid, lingual, and uvula, noticed a relationship between intelligence and the number of cerebellar lamellae. He numbered the lamellae to be able to provide a systematic description of the organ. He noted that the size and number of lamellae were reduced in patients suffering from cretinism, a condition of severe physical and mental retardation due to iodine deficiency. In normal persons, he counted between 500 and 780 folia, while in "idiots," it could be as low as 340. He believed scientists could predict the development of folia before the dissection of a deceased person, based on the manifestation of intelligence during life.[4]

Reproductive Instinct

Franz Joseph Gall (1758-1828; see Figure 4) is well known for having introduced the concept of cortical cerebral localization. He believed that bumps or indentations in the skull reflected growth or underdevelopment of brain regions associated with specific functions. Of the 27 faculties he distinguished, eight were considered distinctly human faculties. He localized the highest faculties — for instance, wit (XXII) and religion (XXVI) — in the top of the front of the brain. In contrast, he located successively more primitive functions to brain organs more posteriorly. The most primitive faculty, that of reproductive instinct (I), was localized in the cerebellar cortex. (See Figure 5a.)

see **HISTORY** *page 14*

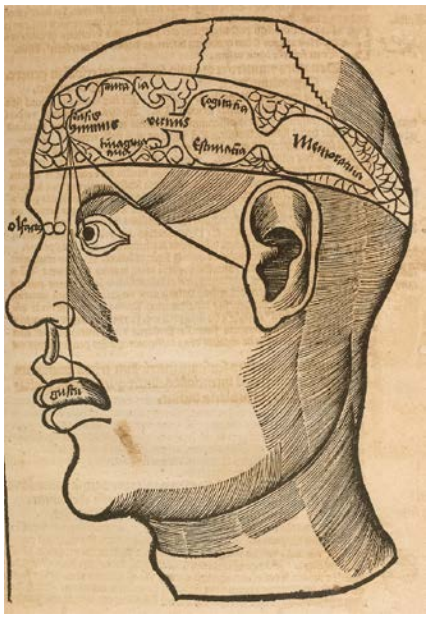


Figure 1. Cell doctrine depicted in Gregor Reisch's *Margarita Philosophica* Woodcut of head showing cerebral ventricles (1508 edition; public domain).

Figure 2. The anatomy lesson of Dr. Nicolaes Tulp, Rembrandt van Rijn, 1632, oil on canvas, 169.5 x 216.5 cm (public domain © Mauritshuis, The Hague).

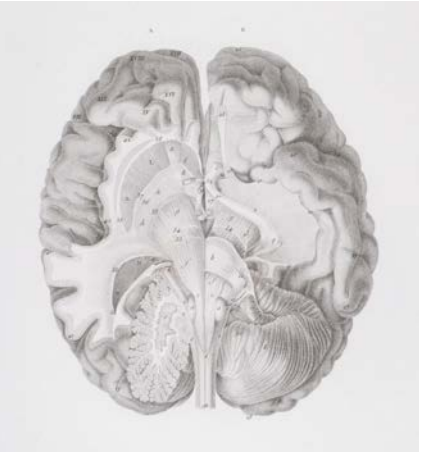


Figure 5a. Plate V from Gall & Spurzheim's *Atlas*.[7] Anatomical drawing with the cerebellum below.

HISTORY

continued from page 13

Figure 5b. Plate XL. From Gall & Spurzheim's *Atlas*.[7] "Son crâne prouve que son cervelet avait acquis un développement très considérable [His skull proves that his cerebellum had undergone considerable development]."

In his writings, Gall provided evidence of this localization with several examples (both positive and negative) in animals and humans. (See Figure 5b.) Some cases were drawn from sick or damaged brains, while others came from studying healthy brains. He examined people and animals with naturally occurring disorders, acute injuries, or surgical procedures including castration. Depending on the age at which this happened, he believed there was an association with the cerebellum: "The lobe of the cerebellum, on the opposite side, visibly decays, or is altered in some way in its substance."[5,6,7]

Gall was not the only researcher to refer to this association. In a chapter on the cerebellum in his book *Leçons sur la Physiologie Générale Et Comparée du Système Nerveux Faites au Muséum d'Histoire Naturelle*, the French physician Alfred Vulpian (1826-1887) reviewed the influence of the cerebellum on the intestines, stomach, heart, and the genito-urinary organs. With respect to the latter influence, he referred to this famous example of a girl:

> "Cette jeune fille a vécu jusqu'à l'âge de onze ans, bien que son cervelet fût entièrement atrophié des les premiers temps de sa vie; et par conséquent l'influence du cervelet sur ces divers organes ne peut pas être considérée comme indispensable [This young girl lived to the age of 11, although her cerebellum was completely atrophied from the beginning of her life; and consequently the influence of the cerebellum on these various organs cannot be considered indispensable]."[8]

He returned to the case at several places in the book. The girl had no sensory loss. However, "la petite fille sans cervelet (observation de Combettes) se

Robert S. Dow (University of Oregon. Medical School, public domain; Robert S. Dow, MD, PhD).

livrait à l'onanisme. [The little girl without cerebellum (observed by Combettes) indulged in onanism]." With respect to another case "la femme dont le cervelet avait subi une atrophie complète de toute son écorce grise, et dont j'ai déjà dit un mot, avait été, d'après certains détails de ses antécédents, atteinte d'un léger degré d'érotomanie [the woman whose cerebellum had undergone a complete atrophy of all its grey cortex, and of whom I have already said a word, had been, according to certain details of her antecedents, affected by a slight degree of erotomania]."[6]

Vulpian's remarks on these cases in fact did not support Gall's hypothesis. More importantly, he added another sign that was observed in the young girl. "L'observation, incomplète du reste, signale un embarras assez grand de la parole, et constate que l'enfant se laissait tomber souvent [The observation, incomplete in any case, points to a fairly great embarrassment of speech, and notes that the child often fell]."[6]

The Scottish/English physician David Ferrier (1843-1928) was another researcher of the period who referred to the Combettes case: "… there still remain numerous well-authenticated and carefully recorded instances, which, though not opposed to Flourens' data, are not capable of being harmonized with his theory — stated without modification — that the cerebellum is the organ of the coordination of movements of locomotion. Many such cases might be quoted, but I select only one or two."[9]

A closer look at the source, the 1831 report by Combettes (intern at St. Antoine Hospital) reveals that the girl had more abnormalities than just atrophy of the cerebellum. The full title of the article was "Absence Complète du Cervelet, des Pédoncules Postérieurs Et de la Protubérance Cérébrale Chez Une

Henrietta C. and Alan L. Leiner (from interview at Oral History Museum available at Oral History of Alan and Henrietta Leiner).

Jeune Fille Morte [Complete Absence of Cerebellum, Posterior Peduncles, and Cerebral Protuberance in a Dead Girl]."

When she was hospitalized at age 9, "elle avait extrêmement peu d'intelligence [she had extremely little intelligence]," and before she died, she was suffering from "convulsions épileptiformes." Part of the brain dissection, after her death at age 11, was done by the Paris physiologist François Magendie (1783-1855).[10]

In his 1997 book "The Cerebellum and Cognition," Jeremy Schmahmann, neurologist at Massachusetts General Hospital and professor of neurology at Harvard Medical School, added a table of "selected clinical reports" with descriptions of cerebellar disorders related primarily to mental retardation.[11]

He noted that "perhaps it should not be surprising that the cerebellum may contribute to sensory, affective, autonomic, and cognitive functions as well as to motor control." He referred to English physician John Hughlings Jackson (1835-1911), who wrote on the continuum from movement to thought. Schmahmann also referred to Ferrier, who wrote that "mental operations, in the last analysis, must be merely the subjective side of sensory and motor substrata."[11]

Henrietta C. Leiner: The Mathematical Analyst

In 1958, neurologist and neuroscientist Robert S. Dow (1908-1995) published a review on the past 100 years of cerebellar physiology and pathology in cooperation with Giuseppe Moruzzi ([1910-1986], co-discoverer of the reticular arousal system with Horace Magoun [1907-1991]).[12] Meanwhile Henrietta C. Leiner (1914-2012) worked as a mathematical analyst in Washington, D.C., where she contributed to the capabilities of the pioneering computers used by the National Bureau of Standards (now known as the National Institute of Standards and Technology). In 1960, her husband, Alan L. Leiner (1914-2010), accepted an offer of employment from the IBM Research Center in New York City.

Interested in neural anatomy, Leiner took courses in neuroanatomy and then dissected brains at Columbia University in New York. From the intensive cerebro-cerebellar connections, she wondered why the cerebral cortex would send so much high-level information down to the "low-level" cerebellum. She hypothesized that the connection "enables the cerebellum to improve the speed and skill of cognitive and language performance in much the same way that the older circuitry enables the cerebellum to improve the speed and skill of motor performance."[13]

She then moved with her husband to Palo Alto, California, where she continued her studies at Stanford University and read the work of Robert S. Dow, to whom she presented her hypothesis. They met in Portland, Oregon, and Dow decided to undertake the clinical testing of patients to find out whether damage restricted to the cerebellum ever resulted in a cognitive deficit.

A series of articles on the subject, written by Henrietta, her husband Alan, who was a computer expert, and Dow followed in the 1986 to 1995 period. They postulated that in the human brain newly acquired cerebro-cerebellar loops could contribute to skilled mental performance in much the same way that the older loops contribute to skilled motor performance.[14] The Leiners also contributed a chapter to Schmahmann's book: "How Fibers Subserve Computing Capabilities: Similarities Between Brains and Machines."[11]

Interest in the role of the cerebellum in emotion and cognition increased after Schmahmann's 1997 book and subsequent publications.[15] Looking back on her career two years before she died at age 98, Henrietta Leiner noted that "the concept of the cerebellum as a motor mechanism has not helped to solve the mystery of

see **HISTORY** *page 15*

HISTORY

continued from page 14

why the human cerebellum enlarged so dramatically in the last million years of human evolution." The syndrome is now known as cerebellar cognitive affective syndrome (CCAS) or Schmahmann syndrome.[16] •

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JUNIOR TRAVELING FELLOWSHIP 2025

Abstract Presentations and Colleague Collaborations in Tokyo

A WFN Junior Traveling Fellowship report from the Asian and Oceanian Parkinson's Disease and Movement Disorders Congress.

BY MEDETBEKOVA SEZIM

As part of my participation in the World Federation of Neurology (WFN) 2025 Junior Traveling Fellowship program, I successfully attended the Asian and Oceanian Parkinson's Disease and Movement Disorders Congress (AOPMC) from March 21-23, 2025, in Tokyo. While there, I presented my abstract, "Awareness of Parkinson's Disease Among the Population of Kyrgyzstan."

The AOPMC brings together doctors, researchers, and other health care professionals to collaborate and share ideas that advance movement disorder science and care. The meeting facilitates communications between clinicians and researchers and disseminates updated knowledge about movement disorders.

With the help of the WFN Junior Traveling Fellowship grant, I was able to attend this large-scale event, which made an invaluable contribution to my career. I met colleagues working in the field of motor disorders from Japan, Korea, and Thailand, and I continue to collaborate with them to this day.

I would like to express my sincere gratitude to the World Federation of Neurology for allowing me this opportunity. •

Medetbekova Sezim is an assistant professor of neurology at the A.M. Murzaliev Department of Neurology and Clinical Genetics at the Kyrgyz State Medical Academy in Bishked, Kyrgyzstan.

(Top) Medetbekova Sezim presents her abstract, "Awareness of Parkinson's Disease among the population of Kyrgyzstan," at the Asian and Oceanian Parkinson's Disease and Movement Disorders Congress.

Medetbekova Sezim (right) with colleagues she met at the Asian and Oceanian Parkinson's Disease and Movement Disorders Congress.

Neurology on Wheels: We Reach, We Teach, and We Treat

Medical student spends a week in rural India observing stroke prevention strategies and innovative treatments.

BY CONNOR MCGINNIS

Traveling from the United States to the coast of India and through its remote villages was never part of my medical curriculum, yet when the opportunity to learn from Dr. Bindu Menon, neurologist and founder of **Neurology on Wheels**, presented itself, I knew I could not pass it up. After obtaining a grant, months of planning, and more than 24 hours of travel, I was warmly welcomed to India with a decorative shawl.

Over the course of one of the most enlightening weeks of my life, I witnessed Indian health care with its emphasis on preventive neurology, timely bedside diagnoses, and an inspiring sense of gratitude. This powerful triad left every patient in a better place — the ultimate goal within medicine.

The emphasis on preventative care and symptom recognition is essential to the community outreach programs provided by the **Dr. Bindu Menon Foundation**. Through the Neurology on Wheels initiative, I observed firsthand the challenges of stroke prevention in rural Andhra Pradesh, India, as well as the innovative strategies employed to overcome them.

Under-resourced areas of India are a critical aspect of the country's health care system. In 2024, roughly 63% of the population lived in rural areas.[1] This statistic highlights the distance millions of patients must travel to receive health care at the nearest hospital, not to mention additional barriers such as socioeconomic restraints and transportation. Targeting villages is the cornerstone of the foundation's approach, as reflected in its motto "We Reach, We Teach, and We Treat."

Educational sessions such as preventative health, stroke symptom recognition, and seizure first aid will empower patients and help reduce the health care disparities. I witnessed community members actively participating in "Sa Re Ga Ma" music notation. Musical mnemonics such as this are used to help patients remember the stroke warning signs. This is comparable to the musical scale of "Do, Re, Mi, Fa, Sol, La, Ti, Do." Creating a memorable outline for the symptoms of stroke can expedite travel to the nearest hospital and help avoid irreversible damage.

Community members asked questions and engaged with pictorial teaching tools. Blood pressure, HbA1c levels and BMI were documented, and individual counseling and medication were administered. The focus on primary care and preventive measures was especially noteworthy.

In addition to its Neurology on Wheels outreach, the foundation offers **free mobile apps** for epilepsy, stroke, and migraine patients. These apps provide education, medication reminders, follow-up support, and direct communication, turning occasional hospital visits into ongoing care. By blending personal outreach with digital tools, the foundation delivers continuous neurological support and bridges gaps in rural health care.

The World Health Organization (WHO) reports there are few interventions addressing sodium consumption in India. It aims to reduce sodium consumption by 30% by the end of 2025.[2] Traditional Southern Indian meals can contain about 15 grams of sodium daily, and the foundation is working to reduce the sodium intake and ultimately reduce the incidence of stroke, which is 80% preventable.[3] Interactive tools such as sodium consumption displayed on a spoon are used to demonstrate the daily recommended sodium value of 5 grams.

Patients in rural India face significant barriers to health care. As a result of these challenges, they are accepted into the foundation for fully funded benefits going forward. This mobile outreach model offers a sustainable approach to bridge gaps in neurological care with the potential for replication in similar rural settings worldwide.

With a population of roughly 1.5 billion, India faces the challenge of providing medical care to an immense number of patients.[4] The patient volume was the most eye-opening. We saw roughly 100 patients per day during my week in Andhra Pradesh. To balance strong clinical care with such great volume, there were multiple key differences within Apollo Hospital. For example, the way patients were seen in the outpatient clinic and on rounds was considerably different than in the U.S. Documentation and medical record processing was done via EMR, and the attention to detail and elaborate physical exams were evident. In outpatient neurological care in the U.S., I have never seen such a focus on primary care. Blood pressure, blood glucose, and thyroid function were consistently measured and discussed.

This global health experience went far beyond traditional medical education. It provided me with a deeper understanding of culturally tailored neurological care and the humanistic side of medicine. Through the departments of neurology, neurosurgery, anesthesia, neurophysiology, and radiology, this opportunity expanded my understanding of the evolution of neurological care at a comprehensive level while providing community-based health care and deepening my skills as a student physician. Experiences in such diverse clinical and cultural environments will help shape a connected future in global neurology. •

Medical student Connor McGinnis (left) and Dr. Bindu Menon.

Connor McGinnis is a medical student at Wayne State University School of Medicine in Detroit, Michigan.

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Connor McGinnis (second from left) and Dr. Bindu Menon visit with patients at a Neurology on Wheels mobile clinic.

Dr. Bindu Menon (left) and Connor McGinnis (center) address attendees at a Neurology on Wheels outreach event.