

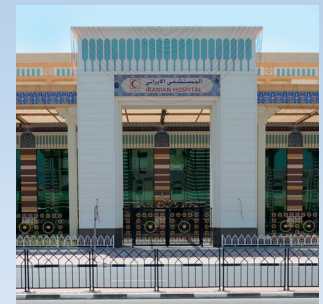
# MagVenture **NEWS**

*Monash Alfred Psychiatry Research Centre:*  
Public reimbursement will ensure widespread rTMS use

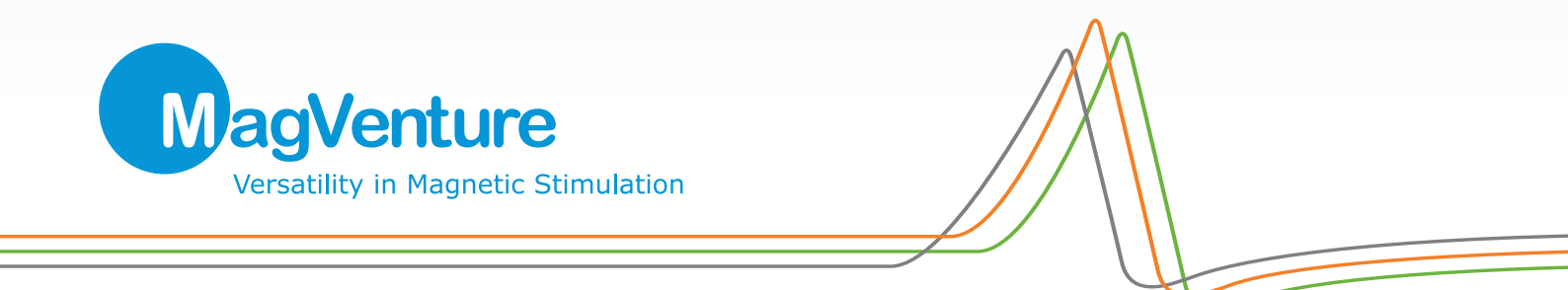
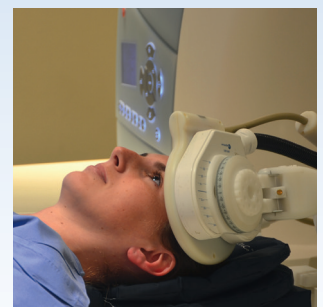


*University of Maastricht:*  
10 questions for Alexander Sack at the Maastricht Brain Imaging Centre

*Iranian Hospital, Dubai:*  
We predict a TMS wave in depression treatment



*Medical University of Vienna:*  
TMS/fMRI research benefits from new MR coil array



# Reimbursement can pave the way for rTMS

In Canada, two provinces already offer rTMS treatment with full public reimbursement.

In Australia, the Royal Australian & New Zealand College of Psychiatrists (RANZCP) has submitted an application for a Medicare item number. If this application for a generalized public reimbursement for rTMS treatment is approved, it will “really allow for a widespread dissemination of the technique”, to quote Australian frontier Professor Paul Fitzgerald from Monash Alfred Psychiatry Research Centre in Melbourne. Read more about these exciting prospects for Australia on the following pages.

In Germany, a general recommendation for the use of rTMS to treat Major Depressive Disorder has also been put forth by the Deutsche Gesellschaft für Hirnstimulation in der Psychiatrie (DGHP), which is the German association of brain stimulation in psychiatry.

In some countries, such as the US and the UK, patients are now being reimbursed by their private health insurance companies.

Depending on perspective, we may not be talking about major steps here, but it is an indisputable fact that rTMS is gaining more and more recognition – we not only see this growing interest and support among clinicians in psychiatry, but also among governmental bodies and associations.

There is also an increasing thirst for knowledge – and knowledge sharing – within the field. rTMS courses are offered on a regular basis in several parts of the world and attended in high numbers. Recently, MagVenture co-hosted a course at Maastricht University in the Netherlands which attracted participants from not only European countries, but also from Asia and North America.



At the same time, we also know that treatment costs for depression and similar mental disorders are skyrocketing.

This only adds to the importance of making sure that the financial aspect of offering the rTMS treatment is both medically and financially feasible – studies have already been published on this matter, but further research is still needed to help us find the most efficient and cost-effective rTMS treatment protocols possible.

**Stig Wanding Andersen**  
CEO, MagVenture

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## Monash Alfred Psychiatry Research Centre: Public reimbursement will ensure widespread rTMS use

*Since the Australian Minister for Mental Health, Mary Wooldridge, launched the country's first Transcranial Magnetic Stimulation (TMS) Clinic at the Monash Alfred Psychiatry Research Centre (MAPrc) in Melbourne in November 2012, Australia has become somewhat of a frontier within the field of rTMS. More and more clinics, both public and private, are now offering rTMS for depression treatment, and courses are offered on a regular basis at highly recognized research organizations. MagVenture NEWS spoke with Professor Paul Fitzgerald, Deputy Director at MAPrc, and among the country's leading researchers within rTMS, to find out more about what is going on Down Under.*

– Australian researchers are generally interested in exploring new technologies in both general and medical fields, explains Professor Paul Fitzgerald. – Back in the 90's, Dr. Saxby Pridmore contributed significantly to the clinical development of TMS treatment for depression.

Since then, we have seen considerable increase across the country in clinicians' interest and enthusiasm for engaging in or referring patients for rTMS treatment although this has been somewhat geographically variable.

We have, nevertheless, been able to establish a network of clinical sites and utilized this network to conduct outcome research and explore important clinical questions in relatively large populations of patients. Today, the development of these clinical centers allows the translation of rTMS treatments into clinical practice across the country, says Paul Fitzgerald.

***There isn't a generalized funding model yet for rTMS in Australia which would really allow for a widespread dissemination of the technique.***

**Paul Fitzgerald**



*Professor Paul Fitzgerald has been a prime mover in ensuring a widespread acceptance and usage of rTMS in Australia.*

### **Wanted: a generalized funding model**

In spite of these initiatives, Paul Fitzgerald fears that Australia may be falling a bit behind: – There isn't a generalized funding model yet for rTMS in Australia which would really allow for a widespread dissemination of the technique, Professor Fitzgerald explains. Today, private insurance bodies do not necessarily reimburse the cost of rTMS treatment, but they do cover the costs of inpatient treatment into hospitals where patients can access rTMS therapy.

### **Public reimbursement is next**

An application for a Medicare item number, that would allow for such a public reimbursement, was therefore submitted in late 2012 by a group of psychiatrists under the auspices of the Royal Australian and New Zealand College of Psychiatrists (RANZCP) led by Professor Cherrie Gellately in Adelaide. The process has been long according to Professor Fitzgerald, but he remains hopeful of getting a positive response to the application by the end of 2014.

### **Spreading the message through education**

Professor Paul Fitzgerald is also putting considerable resources into offering TMS courses. – We have run two courses now for clinicians interested in establishing rTMS programs and see a significant and substantive interest in these programs.



We also provide a service for places which desire to establish clinical TMS programs. This involves the provision of medical and nurse training, information packages and resources as well as ongoing support.

### **Bio-markers determine who will respond to treatment**

– Knowing who will and who will not respond well to treatment is currently a key focus area for many researchers within rTMS, including Paul Fitzgerald: – Establishing decent clinical predictors of response to treatment by finding neurophysiological or other types of biological markers will help us identify the patients that are most likely to respond to the treatment, he explains.

### **Focus on accelerated treatment protocols**

Professor Paul Fitzgerald also predicts an increased focus on the possibility of accelerated responses to treatment in coming years due to the need for more rapidly active antidepressant treatments.

– Accelerated schedules really suit rTMS as the daily treatments schedules can be burdensome for many patients, he says.

### **Personalized treatment for each patient**

Paul Fitzgerald doesn't find that neuroimaging research until now has been properly utilized to improve the application of rTMS treatment, but he does believe that we are getting much closer to the situation where we can actually map brain circuits and specifically target therapy to the individual patient: – This type of personalized medicine is increasingly seen to be an important way to enhance patient outcomes and an area where significant rTMS innovation can occur, he explains.

### **High dose protocols: Promising results**

Professor Paul Fitzgerald is currently investigating the relationship between the dose of stimulation and the therapeutic response. – Although it makes sense to assume that higher doses will produce greater clinical benefits, this need to be directly explored as there may be a ceiling on what is an effective dose.

In regards to dose, we also want to establish whether response to rTMS can be accelerated with high dose concentrated schedules. So far, we have had considerable success in

this regard. Certainly, getting patients better in a much reduced period of time would be a significant clinical advance, states Paul Fitzgerald.

### **Magnetic Seizure Therapy could replace ECT**

Professor Fitzgerald is also enthusiastic about the potential of convulsive rTMS or magnetic seizure therapy (MST): – Although this remains a small area of research compared to rTMS, its potential to significantly replace ECT for many patients, by limiting the development of cognitive side-effects, is really promising, he says.

### **The eternal challenges of funding**

The biggest challenge is always, however, the funding. – Research funding bodies tend to like simplistic studies, for example trials comparing active treatments to placebo to establish efficacy. These are easy to understand and attractive to funding bodies. They are far less interested in finding the type of incremental development research which ultimately improves the application of treatments such as the types of studies we are trying to do with rTMS now.

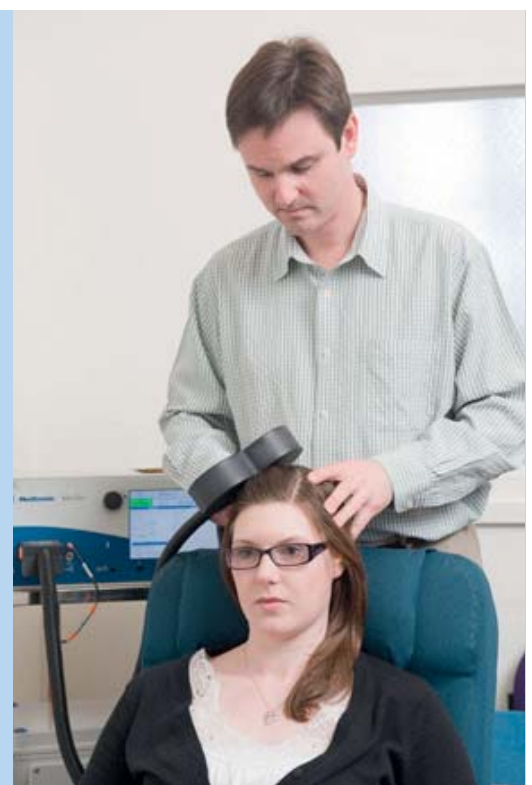
## **Professor Paul Fitzgerald**

Paul Fitzgerald is Deputy Director at the Monash Alfred Psychiatry research centre (MAPrc) based in Melbourne, Australia.

Paul Fitzgerald is Professor of Psychiatry and Consultant Psychiatrist at Alfred Psychiatry. He is a qualified psychiatrist with a Master of Psychological Medicine and research PhD.

Professor Fitzgerald runs a substantive research program which utilizes brain stimulation and neuroimaging techniques such as transcranial magnetic stimulation. The program conducts investigative studies of brain function/dysfunction in disorders such as schizophrenia, depression, substance abuse and autism as well as clinical trials of novel brain stimulation techniques in these disorders.

Paul Fitzgerald is also the Chief Investigator at MAPrc on the first clinical trial in Australia of Magnetic Seizure Therapy versus ECT in the treatment of depression. The trial is sponsored by Australia's National Health and Medical Research Council (NHMRC).



**+** More information at: [www.maprc.org.au](http://www.maprc.org.au)  
Upcoming courses and support: <http://tmscourse.com/>

# University of Maastricht: 10 questions for Alexander Sack at the Maastricht Brain Imaging Centre

*Professor, Dr. Alexander Sack and his team use TMS for fundamental brain research and as a clinical tool in rehabilitation. Their aim is to develop new transcranial magnetic stimulation protocols for rehabilitation of patients with deficits in various executive functions of the brain.*

## **1. What initially got you interested in TMS?**

– Its unique potential to act as a research tool helping to reveal causal structure-function relationships, while at the same time being a promising new method in various clinical applications in the fields of neurology, psychiatry, and rehabilitation.

## **2. How long have you worked with TMS?**

– For more than 15 years.

## **3. What are your main areas of interest within TMS?**

– Most of my projects focus on the neurobiological principles underlying human cognition including visual awareness and consciousness, spatial attention, visual learning and memory, cross modal perception, and cognitive control.

These functions are collectively referred to as the executive functions

of the brain, representing the management, regulation, and control of cognitive processes.

## **4. Why do you use TMS?**

– I use several methods to identify which brain networks underlie the different executive functions, but TMS serves as a unique research tool capable of testing the functional relevance and causal contribution of stimulated brain regions for the cognitive process under investigation.

TMS studies can provide great insights into the processes within these networks, testing under con-

caused by for instance stroke. We aim to develop new TMS protocols for rehabilitation of patients with deficits in various executive functions.

## **5. What is your main motivation for working with rTMS?**

– I am intrigued by the methodological possibility to not only noninvasively observe the living brain at work using noninvasive functional imaging, but at the same time use noninvasive brain stimulation to manipulate and directly interfere with ongoing neural processes to better understand the structure-function relationships in human cognition.

***TMS serves as a unique research tool capable of testing the functional relevance and causal contribution of stimulated brain regions for the cognitive process under investigation.***

**Alexander Sack**

trolled lab conditions how the brain copes with local experimentally-induced neural disturbances.

In a translational approach, I then try to apply these fundamental insights to clinical practice, guiding adaptive plasticity in patients suffering from deficits in e.g. memory or attention

Of course most rewarding is then if these insights can be utilized for novel therapeutic approaches in the treatment or rehabilitation of brain lesion patients.

## **6. What kind of research are you conducting right now?**

– We are conducting several lines

## Professor Alexander Sack

Alexander Sack is Professor of Functional Brain Stimulation and Neurocognitive Psychology at the Faculty of Psychology and Neuroscience at Maastricht University in The Netherlands.

Alexander Sack's main expertise lies within neurocognitive psychology, cognitive neuroscience, multimodal brain stimulation and brain imaging. His research focuses on the neurobiological and psychological principles underlying perception, attention, learning and memory, and the neural network dynamics underlying spatial cognition in healthy volunteers and stroke patients.

Alexander Sack and Maastricht Brain Imaging Centre offer TMS courses focusing on the clinical application of TMS. Please contact MagVenture for further information.



Photo by SACHA RULAND

**+** For more information:  
<http://www.maastrichtuniversity.nl/mbic>

of research in healthy volunteers to unravel the neural network dynamics underlying the executive functions of human cognition.

One research line focuses on spatial attention where we combine functional magnetic resonance imaging (fMRI) and TMS to study the neural network effects underlying the control of spatial attention.

Another research line is about visual learning and memory where we investigate the mechanisms of working memory by means of psychophysical studies, noninvasive brain stimulation, and neuroimaging.

In a third research line, we aim to investigate the role of fronto-cortical brain areas in cognitive control and

challenge. We are constantly working on improving these procedures.

### **8. What will be the main area of focus for your department in the coming years?**

– To expand clinical TMS applications. Noninvasive brain stimulation is capable of manipulating neural activity and network excitability during and beyond the stimulation protocol. This gives rise to its clinical application in various psychiatric, neurological, and rehabilitation settings.

### **9...and where will you begin?**

– Our first and most direct clinical application is related to neglect rehabilitation after stroke. It is important to realize that the spontaneous functional reorganization in stroke patients is often maladaptive.

ously combined in one experimental session. With this triple-method combination you have all sorts of complimentary information available. This includes the high temporal resolution and frequency spectrum data from EEG, the whole brain network effects as measured by fMRI, and the effects of stimulating different nodes of the network using TMS.

At the same time you thus assess the effects of TMS on behavior, whole brain network activity, and brain rhythmic activity. I consider this a powerful new approach and would like to further optimize and apply it in the context of more concrete empirical research/clinical questions.

## **TMS Certified User Training at Maastricht Brain Imaging Centre**

Maastricht Brain Imaging Centre has developed a standardized and certified procedure regarding the safe use of TMS as a research tool. This includes several formal procedures such as formalized subject screening, pre-experimental checks, systemized side effects assessments, subject data bases, ethical approval and project proposals, but most importantly also a TMS Certified User Training.

The TMS Certified User Training involves several theoretical and practical sessions including safety and risk management training, handling of machines and coils, TMS protocols, TMS design and procedures.

The trainee has to conduct 10 TMS sessions under supervision of a certified user before he or she can get TMS certified.



***We have recently pioneered in combining TMS not only simultaneously with either EEG or fMRI, but conducted the first study in which TMS, EEG, and fMRI were all simultaneously combined in one experimental session.***

**Alexander Sack**

how functions supported by this part of the brain relate to human decision making and social behavior. Finally, we also do research within cross modal perception.

### **7. What is the main challenge in your research?**

– What may limit the conclusions and interpretations of pure behavioral TMS studies is that they alone do not show us the full picture of how structure and function are related. We stimulate a certain region with TMS and measure the consequences on behavior, or clinical symptoms. From these effects we conclude what sort of neural effects we probably induced in the brain.

But it would be even more conclusive if we also directly measured the brain effects of TMS during behavior by combining TMS simultaneously with EEG or fMRI.

We have successfully conducted such multimodal TMS studies in Maastricht. However, the entire set-up, data acquisition and analysis, as well as interpretation of the network effects of TMS, still often poses a great

We intend to use noninvasive brain stimulation to suppress/activate different parts within the reorganized activation network in order to restore a more healthy balance between hemispheres and thereby promote behavioral recovery.

We will systematically exploit our basic brain research findings in order to initiate, guide, and support brain recovery in stroke and neglect patients, developing a new and powerful tool for rehabilitation.

Existing fragmentary evidence indicates that our approach of manipulating brain plasticity (block it when it is maladaptive, stimulate it when it is adaptive) will be highly successful, and offers a realistic perspective for extension to other neurological populations, including amputation or Parkinson patients.

### **10. What kind of research would you like to do in the future?**

- We have recently pioneered in combining TMS not only simultaneously with either EEG or fMRI, but conducted the first study in which TMS, EEG, and fMRI were all simultane-



## Iranian Hospital, Dubai: We predict a TMS wave

*Dr. Ali Vahdani is head of the psychiatric clinic at the Iranian Hospital in Dubai (IHD). He supervises the rTMS administration for depression treatment at the hospital. So far, more than a 100 patients have been treated at IHD and the interest does not seem to be slowing down; on the contrary.*

– We first came to know about TMS as a new treatment modality about 4-5 years ago while we were reviewing related psychiatric literature and updates, says Dr. Ali Vahdani. Once the decision to invest in a TMS system had been made, things went “smoothly,” tells Dr. Vahdani, and mentions that the practical aspects such as the application and other related issues were handled in a safe and uncomplicated manner.

### Clinical visit first

The admittance process to TMS treatment usually goes through the psychiatric clinic at IHD: – Patients are either referred to us from other centers or visited by our psychia-

***We see a very significant satisfaction rate of patients and success rate in reducing the patients’ HAMD rating.***

**Dr. Ali Vahdani**

trists, says Dr. Vahdani – Their diagnosis of Major Depressive Disorder has already been confirmed by the psychiatrist during the clinical visit. The clinical visit also includes the 17 Item Hamilton Depression Rating Scale (HAMD) (see box).

– Eligible patients will then be admitted for TMS treatment. Usually our physician and our psychologist team will then inform the patient about the treatment, says Dr. Vahdani and further mentions that the response is generally very positive:

– At the beginning they may have some concerns about the safety. They may confuse it with ECT (Electroconvulsive Therapy) but as soon



*Main entrance of the Iranian Hospital in Dubai. The hospital was founded in 1970, making it the first health care provider in the region.*

as we explain the whole process and demonstrate the TMS machine, they usually accept it and are comfortable with it. After the first treatment session, there is no hesitation anymore and everything goes perfectly.

with other first choice modalities like Cognitive Behavioral Therapy or antidepressant medication, he says.



*Dr. Ali Vahdani, head of the Psychiatric clinic at the Iranian hospital in Dubai, is seeing a growing interest in the region for rTMS for depression treatment.*

### Significant improvements in patients

– So far we have admitted over a hundred patients to rTMS treatment here at IHD, says DR. Vahdani. The patients all receive the full course of 20 treatment sessions during a period of 4 weeks (5 sessions weekly). Furthermore, all patients receive a primary outcome assessment at the end of the 4th week of treatment, including HAMD. In total we see a very significant satisfaction rate of patients and success rate in reducing the patients’ HAMD rating, says Ali Vahdani. – We consider TMS to be the first choice in the treatment of Major Depressive Disorder along

### Compliance better with rTMS

Ms. Azadeh Shahisavandi is the psychiatric nurse and responsible for operating the rTMS clinic at the hospital: – We find it very safe and easy to use, she says. – Our patients are

comfortable with the whole process and the outcome is at least the same as the medication use. The patient's compliance, however, is much better with TMS. Also it is a very good alternative for depressive disorder treatment in patients who do not wish to take medicine.

### Psychotherapy during treatment improves outcome

Besides operating the TMS equipment and supervising the patients during the treatment session, Ms. Shahisavandi is also skilled within psychotherapy due to her background as psychiatric nurse.


So while the patients are comfortable and relaxed during the TMS session, there is also a chance to run a psychotherapy session. Ms. Shahisavandi says that many patients choose this option instead of watching TV or listen to music which is also offered.

– With a total of 20 TMS treatment sessions, the focus on problem solving skills of the patient and other fields which would be determined during the primary evaluation of the patient is a great opportunity as it enables us to improve the outcome and compliance of treatment, says Dr. Vahdani.

### Rapid “TMS surge” expected

When asked about the future of TMS, Ms. Azadeh Shahisavandi replies that she is seeing a growing interest in the medical community of the Middle East, especially among psychiatrists and psychologists where she expects to see a “rapid surge” in the usage of TMS for the treatment of depression. The clinic encourages anyone who is considering offering TMS to contact IHD to share results and experiences.

## Iranian Hospital Dubai

 More information at [www.ihd.ae](http://www.ihd.ae)

## Hamilton Rating Scale for Depression (HAM-D)

The Hamilton Rating Scale for Depression (HRSD), abbreviated HAM-D, is a multiple item questionnaire used to provide an indication of depression, and as a guide to evaluate recovery. Hamilton originally published the scale in 1960 and revised it several times over the years. The questionnaire is designed for adults and is used to rate the severity of their depression by investigative mood, feelings of guilt, suicide ideation, insomnia, agitation or retardation, anxiety, weight loss, and somatic symptoms.

The original 1960 version contains 17 items to be rated (HRSD-17). A score of 0-7 is considered to be normal. Scores of 20 or higher indicate moderate, severe, or very severe depression, and are usually required for entry into a clinical trial. Questions 18-20 may be recorded to give further information about the depression (such as whether diurnal variation or paranoid symptoms are present), but are not part of the scale.

Although Hamilton's original scale had 17 items, other versions were developed to include up to 29 items (HRSD-29). Other much used scales include the Montgomery-Åsberg Depression Rating Scale (MADRS) and the Beck Depression Inventory (BDI)

## NEW!

### Special air-cooled coil for interleaved TMS-fMRI

– For protocols requiring a higher number of stimuli

The ultimate rTMS tool for neuroimaging with all the features from the regular MRI-B91 coil but now with air cooling.

- For complete depression protocols inside the scanner
- At least twice as many stimuli per session
- Turnkey solution offering reduced RF noise, improved image quality, and enhanced safety



 More information at [www.magventure.com](http://www.magventure.com)



# Medical University of Vienna: TMS/fMRI research benefits from new MR coil array

*At the Medical University of Vienna, Austria, Associate Professor Dr. Christian Windischberger and his team have developed a new MR coil array for use in combined TMS/fMRI experiments. The MR device enables ultra-fast, high-resolution fMRI while at the same time efficiently and safely stimulating the brain with TMS.*

Recent years have witnessed an increasing interest among researchers to perform studies using simultaneous functional magnetic resonance imaging (fMRI) and transcranial magnetic stimulation (TMS). This combination allows researchers to directly study the effects of local TMS-induced alterations of cortical excitability. In particular, combined TMS/fMRI research can help answer questions on causality in neuronal networks.

– Functional MRI on its own is an excellent technique for mapping brain activity with high spatial resolution. It can also be used to reveal functional networks based on coherent activation time courses. Causal relationships, however, can only be assessed using advanced mathematical modelling that requires a number of assumptions, e.g. about hemodynamic coupling parameters. Here, TMS offers the unique possibility to apply stimulation pulses to

selectively excite or inhibit cortical areas at well-defined times. No other non-invasive method allows such a direct interaction with neuronal networks, says Christian Windischberger, Associate Professor at the Center for Medical Physics and Biomedical Engineering at the Medical University of Vienna when asked what interest him the most in combined TMS/fMRI studies.

coil to allow enough space to position the TMS-coil on the scalp. Due to their inherently low sensitivity, such birdcage coils are no longer used in fMRI studies and have been replaced by multi-channel receive coil arrays. To fully exploit the potential benefit of such coil arrays, they must be positioned close to the head. On the other hand, the TMS coil must also be close to the head

***This new MR-coil will open up new options in TMS/fMRI research targeting the effects of TMS at the site of stimulation.***

**Christian Windischberger**

## **The making of a better MR device**

To date, researchers have used a large, standard birdcage MRI head coil in order to provide enough space between the head and MR coil to position the TMS system. This has not only resulted in poor sensitivity, but also made it impossible to use parallel imaging methods. Christian Windischberger and his team therefore embarked on the project of inventing a new MR device to replace the standard, birdcage MRI head coil.

– The setup for performing concurrent TMS/fMRI studies requires the use of a large-volume birdcage MR

to achieve efficient stimulation, says Christian Windischberger about the dilemma.

## **The biggest challenge**

The team's approach to solving this challenge was to design an ultra-thin MR coil array and place it between the TMS coil and the scalp.

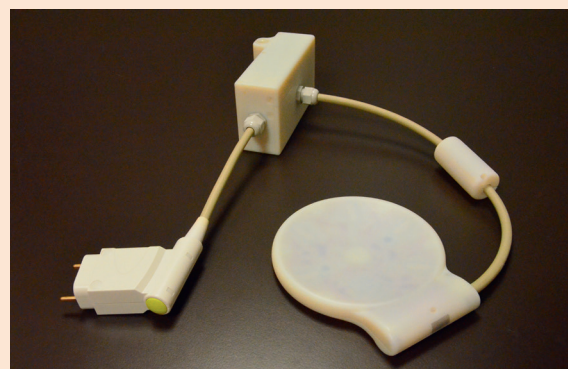
Two years and several prototypes later, the team succeeded in developing a 7-channel receive coil array that achieves a dramatic increase in image SNR (signal-to-noise ratio) and at the same time minimizes the influence on TMS-amplitude.

**The new combined MR device consists** of the original MRI-B91 coil from MagVenture and the new MR coil array, which is positioned between the head and the TMS coil.

It is specifically designed for use in 3 Tesla Siemens scanners and consists of seven hexagonally arranged loop elements of 6 cm diameter each. The MR coil array is constructed on a curved surface to fit the average human head.

It enables increased image SNR and allows for the use of state-of-the-art parallel imaging and multi-band multi-slice excitation techniques, thus greatly increasing temporal resolution.

The coil is much more flexible in positioning on the scalp. It does not cover the whole brain, but it is possible to use two of the new MR coil arrays in combination to achieve almost full coverage of the cerebrum.





Before: The old standard birdcage MRI head coil.



After: The new ultra-thin MR coil array, mounted on the MagVenture MRI B91 Coil.

– The main challenge was to reduce the thickness of the coil. Space inside such a thin MR coil array housing is extremely limited and all electronic components had to be completely redesigned in order to meet these space constraints, says Christian Windischberger of the challenging task of inventing the new MR coil array.

#### Future TMS/fMRI research

– I think that this new MR-coil will open up new options in TMS/fMRI research targeting the effects of TMS at the site of stimulation. Studies examining sub-threshold stimulation will particularly benefit from the possibility to use parallel imaging and multi-band acquisition in combination with a substantial boost in sensitivity. As a result of such studies, I expect new insights into the fundamentals of TMS effects which will not only allow for a more detailed understanding of TMS as a method, but will also extend TMS to a wider range of clinical applications in psychiatry

and neurology, foresees Professor Windischberger.

#### Future coil designs

As part of the Research Studio Austria at the Medical University of Vienna, headed by Professor Ewald Moser, the researchers are already thinking about other innovative coil designs.

– We are currently working on new coil designs to implement the multi-channel receive array concept on elastic support materials. This is a challenging endeavor as we need to ensure an implementation where maximum flexibility is combined with appropriate robustness to enable applicability in clinical studies, ends Christian Windischberger.

### Want to know more about fMRI/TMS?

Check out MagVenture NEWS #1  
Special edition: Interleaved TMS/fMRI

 [www.magventure.com](http://www.magventure.com)



### Associate Professor Christian Windischberger

Associate Professor, Ph.D. Christian Windischberger is Deputy Head of MR Physics at the Center for Medical Physics and Biomedical Engineering at the Medical University of Vienna, Austria.

Windischberger's main interests lies within development and application of methods for pushing the limits of functional MRI, in particular connectivity assessment using both Dynamic Causal Modeling (DCM) and resting-state methods.

He is the author of over 70 articles, cited over 3,000 times.

#### More information at

 [www.meduniwien.ac.at/rsa-mrlab](http://www.meduniwien.ac.at/rsa-mrlab)

 [www.fmri.at](http://www.fmri.at)



## Courses and product news

### TMS Workshop at DRCMR, Denmark

This intensive TMS course takes place on November 26-28, 2014, at Hvidovre Hospital near Copenhagen and will include:

- Academic lectures.
- Hands-on sessions.
- Focus on scientific TMS applications and multimodal integration. (TMS-EEG, TMS-fMRI).
- Individual feedback session on planned experiments.

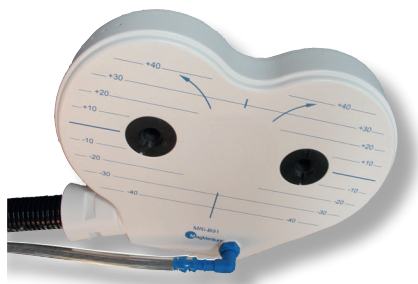
**Place:** Danish Research Center for Magnetic Resonance (DRCMR)

**Date:** November 26-28, 2014

**Number of participants:** 30

**Price:** €290, students €190

**+ Further information & registration:** [ancken@drcmr.dk](mailto:ancken@drcmr.dk)



### New air-cooled MRI coil

Upon request from leading research institutions, MagVenture has developed an MRI compatible coil which is able to run longer and tougher protocols inside the MRI scanner.

The air-cooled MRI-B91 is a modified version of the standard MRI-B91 coil but has an air inlet hole and a number of holes for air outlet. The coil can be connected to a wall outlet of compressed air to cool down the coil windings inside. The new coil can therefore provide a higher number of stimuli before heating (depending on the cooling available). The Air-cooled MRI-B91 is already in use at Stanford, Maastricht and Leipzig University.

**+ More information at:** [info@magventure.com](mailto:info@magventure.com)

### New asymmetrical coil

MagVenture has developed an asymmetrical coil for research – the Cool-D50 – enabling simultaneous stimulation of two centers in the brain with only 2-3 cm apart. By using two Cool-D50 coils and paired pulses, it is possible to enhance/reduce the oscillation of two centers located very close to each other in the brain.

The stimulation center of the coil (where the magnetic fields are the strongest) is placed close to the edge of the coil as opposed to the center of the coil which allows for this simultaneous stimulation at two proximate sites.



## Rehabilitation Forum in Japan gathers 200 professionals

On August 2<sup>nd</sup> -3<sup>rd</sup> 2014, The Jikei University School of Medicine, Japan, hosted its 5th annual Stimulation Therapy Forum. Professor Dr. Abo from the Jikei University served as chief facilitator and the medical device company INTER REHA as cooperative partner.

In 2010, about 10 Jikei-related professionals gathered for the 1<sup>st</sup> Stimulation Therapy Forum to exchange opinions and give research presentations.

This year, no less than 200 medical professionals participated at the Forum where researchers and practitioners within the field of



Dr. Yamada explains the treatment methods for upper paralysis with a MagPro stimulator during the Rehabilitation Forum.

rehabilitation gave more than 15 presentations as well as workshops with MagPro equipment. The Forum expects to develop even further in

the coming years into a scientific society for upper- and lower limb paralysis, aphasia etc.



# About MagVenture

MagVenture is a medical device company, established in 2007, specializing in non-invasive magnetic stimulation systems for depression treatment as well as for clinical examination and research in the areas of neurophysiology, neurology, cognitive neuroscience, rehabilitation, and psychiatry.

From its headquarters in Denmark, MagVenture develops and markets advanced medical equipment based on the use of pulsating magnetic fields.

MagPro magnetic stimulators are sold on the world market through direct sales subsidiaries in Germany and the USA, and through a global network of distributors in Europe, Asia, Middle East, and the Americas.

## Regulations in the USA

In the USA federal law regulates the sale of Medical Devices through the US Food and Drug Administration (FDA). This is done to ensure safety and effectiveness. Devices which are permitted to be marketed for their intended use must either have a 510(k) or PMA clearance.

MagPro® stimulators R30, R30 with MagOption, X100, and X100 with MagOption are all FDA 510(k) cleared (k061645, k091940). The intended use is stimulation of peripheral nerves for diagnostic purposes.

The use of devices for other than their FDA cleared intended use is considered as investigational. Such use is only permitted if the Investigational Device Exemption (IDE) guidelines have been followed. For full information on this procedure, please consult FDA's website ([www.fda.gov](http://www.fda.gov)).

All investigational devices must be labeled in accordance with the labeling provisions of the IDE regulation (§ 812.5) and must bear a label with this statement:

“CAUTION Investigational Device. Limited by Federal (or United States) law to investigational use.”

Please note that transcranial magnetic stimulation (TMS, rTMS) with MagPro stimulators is considered investigational in the USA.

For further information please contact MagVenture.

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