

# Le Bonheur Brain Waves

**Le Bonheur**  
Children's Medical Center  
Neuroscience Institute

Referrals: 888-890-0818

## Technology sharpens neuro diagnostics

Le Bonheur is the third pediatric hospital in the country with cutting edge technology capable of taking images of brain activity in order to pinpoint problems.

The magnetocephalography (MEG) center is a clinical first for the five-state area including Tennessee, Kentucky, Arkansas, Oklahoma and Mississippi.

"The opportunity to have the MEG laboratory based in our growing Neuroscience Center at Le Bonheur allows us to take better care of children with complex brain problems in Memphis and all of the surrounding states," said Dr. James Wheless, director of Le Bonheur's Neuroscience Center and Comprehensive Epilepsy Program.

Specifically, the MEG performs functional mapping of the eloquent cortices (hearing, sensory, motor, language and vision) for patients with brain lesions such as tumors. It is also helpful in characterizing epileptic activity. The MEG is the first diagnostic imaging technology approved in the United States to do such mapping.

MEG is primarily used to determine if surgery is appropriate for patients with epilepsy whose seizures cannot be controlled by drug therapy, as well as for patients scheduled for other neurosurgical procedures of the brain. For tumor patients, the MEG can give direct measure and mapping of brain function, high temporal resolution and excellent spatial resolution.

The MEG is led by Technical Director Mark McManis, a neuroscientist with a Ph.D. in developmental psychology.

The Urban Child Institute donated \$2.9 million toward the MEG – to promote basic science research for pediatric neurosciences.

MEG scheduler Delayne Williams can be reached at 287-5101 or williah@lebonheur.org.



## MEG lab enhances imaging, mapping

When Le Bonheur Children's Neuroscience Institute opened its magnetocephalography (MEG) laboratory last year, it added an invaluable tool to its arsenal for fighting pediatric neurological disorders.

The \$3.1 million, state-of-the-art technology uses magnetic fields generated by neuronal activity in the brain. The locations of those magnetic fields are used to locate sources of activity in the brain, and in turn help neuroscientists working to diagnose and treat children.

Just what the MEG will be able to do for the future of pediatric neuroscience is still being uncovered. But today, at Le Bonheur Children's, it's changing lives. Here's a look at two cases where the MEG proved invaluable:

### Case study No. 1

A 5-year-old boy presented with partial seizures beginning in his left hand that went into generalized convulsions. After physicians at another hospital found a low-grade glioma in the boy's central sulcus, he was referred to Dr. Frederick Boop, medical director of Neurosurgery in Le Bonheur's Neuroscience Institute.

Boop ordered a magnetocephalography scan in hopes of pinpointing sensory and motor function in the brain, in relation to the tumor.

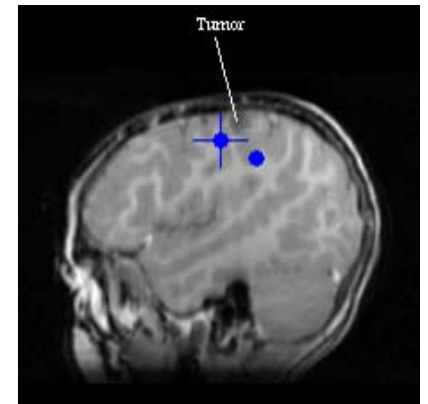
MEG Technical Director Mark McManis, PhD, was able to localize the sensory and motor functions near the region to be resected by conducting passive range of motion tests. In those tests, McManis flexed and extended the sedated boy's right hand — allowing the MEG to identify where the function was located.

Though the tumor was lying in the middle of the boy's sensory and motor function for his left hand, the MEG was able to give Boop exact detail on what area could be resected while preserving function. Boop was able to resect the tumor and enable the boy to regain function in his left hand.

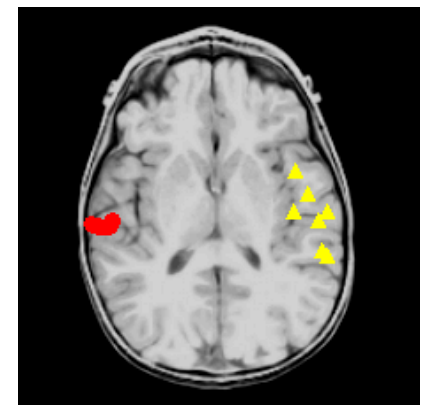
### Case study No. 2

A 3-year-old girl presented with complex partial seizures and occasional convulsions. Medication was not effective in treating the seizures.

The seizure activity was coming from the child's left temporal lobe, an area of the brain that holds the language function in a typically developing child. Le Bonheur Neurologist Dr. Fred Perkins wanted to find relief from the seizures if



MEG scans helped Le Bonheur neuroscientists locate function – and in turn diagnose and treat two young patients recently. Pictured above is a scan of a 5-year-old boy with a tumor. The blue dots show where the index and middle fingers' sense of touch is located in relationship to the tumor. Pictured below is a MEG scan of a 3-year-old girl with epilepsy. The red dots show language on the right side of the brain while the yellow dots show epileptiform discharges on the left side of the brain. The images are in standard radiological view (left side of the brain is on right side of the picture).



possible, but was unwilling to compromise the young girl's language function.

Perkins requested language mapping to be done in the hospital's magnetocephalography clinic in order to locate the girl's language function in relation to her seizure activity. The MEG test showed that language lateralized to the right temporal lobe – far from the seizure activity.

Subsequent testing confirmed the MEG results, and surgeons were able to resect the area of the brain causing the seizures without affecting language.

MEG Technical Director Mark McManis (left) and Epilepsy Coordinator Karen Butler (right) prepare for a MEG scan for Le Bonheur patient Olivia Jones (center).

## Neuropsychologist to use MEG lab to study function



*Vickie Brewer, PhD*

A Le Bonheur neuropsychologist is using brain mapping technology to learn more about what areas of the brain control things like language, memory, and visual perception – and how conditions like epilepsy affect that function.

Vickie Brewer, PhD, is leading the research using magnetocephography (MEG) technology – which can perform functional mapping of eloquent cortices for patients. Le Bonheur is the third pediatric hospital in the country with the technology. Brewer's research marks the first Le Bonheur Children's cognitive neuroscience project attached to the MEG, which opened last year.

The project will study the scans of children with known epileptic lesions along with those of typically developing children. Brewer hopes to learn more about the anatomy of the brain and how

neurological disorders can affect the brain's ability to function.

As a neuropsychologist, Brewer uses tests developed to specifically assess receptive and expressive language, memory, planning, organization, and visual processing among other cognitive processes. Through these tests, neuropsychologists help diagnose neurological disorders. Neurologists and neurosurgeons often consult with neuropsychologists when diagnosing, treating, and localizing central nervous system disorders.

MEG technology will enable Brewer and her team to see what areas of the brain "light up" on the lab scan when children do certain tasks. Specifically, she'll look at visual perception, expressive language and receptive language.

"The MEG can teach us so much about the brain because it can pinpoint more precisely how the brain processes information, whereas an MRI just looks at anatomy," Brewer said. "We're very excited about the research potential the MEG offers. It offers a bridge between anatomy and function that has never been available before."

## Brain Tumor director brings passion, love from families, to new role



*Brain Tumor Director Tracy Tidwell (center) checks in on a Le Bonheur patient during his Rehabilitation session.*

She is a playmate to patients, a counselor for parents, and the jack of all trades for so many physicians.

And now, Tracy Tidwell holds another title. Tidwell, a neurosurgery nurse practitioner, was recently named Le Bonheur's Neuroscience Institute Brain Tumor Program director. Le Bonheur's Brain Tumor Program is a joint effort with St. Jude Children's Research Hospital.

In her new role, Tidwell will focus her clinical leadership on patients with brain tumors and assume primary responsibility for directing the brain tumor program within the Neuroscience Institute. She will

also serve as the key liaison to St. Jude.

"I am committed to serving children from all areas," Tidwell said. "I will do whatever needed to assist in easy transition of referrals or transfers of patients."

Tidwell, a PNP, started working in Le Bonheur's Emergency Department in 2000 before transferring to the neurosurgery nurse practitioner role in 2005.

"One look on a mother's face that has just been given her child's diagnosis told me that this was what I

was born to do. These children have taught me more about living than anyone could imagine," Tidwell said. "I also know that we have one of the best children's hospitals in the world and the best brain tumor program anywhere."

Tidwell said she looks forward to working closely with brain tumor patients and families to improve Le Bonheur's program – especially as the hospital strives to make the program completely family/patient-centered driven.

To refer patients to the brain tumor program, call 1-866-705-8279 or 901-287-5090.

## Neuroscience team adds new administrators

Le Bonheur's Neuroscience Institute has added two new faces.

Will Lowes has been named service line director for Le Bonheur Neuroscience program. He comes to Memphis from Children's Medical Center in Dallas and has extensive experience in service line management, strategic planning and operational leadership.

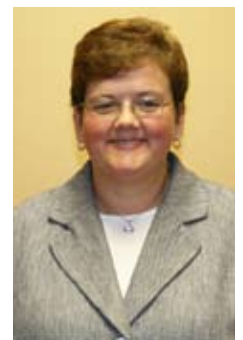
"As service line director, Will will partner with the neuroscience physicians and operational leadership to provide planning, development and strategic execution for Le Bonheur's Neuroscience program," said Director of Business Development Laura Miller.

In addition, Kim Hallum has been named director of Neuroscience Operations at Le Bonheur Children's. Kim began her career at Le Bonheur as an administrative resident in 1994 and left in 1999 to pursue leadership roles at Arkansas Children's Hospital and in the private business sector.

"In her new role, Kim will have operational responsibility for the EEG/EMU, Sleep Center and MEG. Please welcome Kim to the team and back to Le Bonheur," Miller said.



*Will Lowes*



*Kim Hallum*