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**Upcoming Events**
President’s Message
by Judy Ahn-Ewing, R. EEG/EP T., CNIM, CLTM, BA

Spring Forward
Here in the Midwest, spring came quite a bit sooner than we’re accustomed to, with eighty-degree days in March, and the rhododendrons blooming before we set the clocks forward.

In ASET, at the midyear board meeting, matters also moved ahead quickly. We laid the foundation for a critical look at our governance model. In a facilitated discussion, we considered the characteristics of a vision-driven, outwardly focused board, as compared to an operational board. Forces in the field are demanding that we as leaders take a step back and refocus on the broader issues of an organization that represents Neurodiagnostic professionals in a rapidly changing medical environment. These considerations will continue throughout the year, with the final result a strategic plan for the next three to five years.

The membership as a whole can participate in this process, not only by input to board members and representatives, but also by participating in the election of four new board members, persons who will ratify and execute the strategic plan now in formulation.

ELECTING YOUR LEADERSHIP IS A VERY IMPORTANT AND FUNDAMENTAL RESPONSIBILITY OF ALL MEMBERS. WITH YOUR VOTE YOU HAVE THE POWER TO MAKE A DIFFERENCE AND POSITIVELY IMPACT THE ORGANIZATION’S STRENGTH AND DIRECTION.

Please also participate in nominating your fellow ASET members for the two 2012 Annual ASET Awards. All members have the opportunity to nominate peers and colleagues for the Theda Sannit Outstanding Educator Award, and Distinguished Service Award.

Awards are one very important form of recognition. They motivate to do outstanding work and establish standards of excellence by which we can all evaluate our work. Awards from our professional organization are credible signs of high achievement to those outside of our profession – signs that often serve as valuable evidence when individuals are considered for professional advancement.

ASET seeks to recognize those individuals who have demonstrated leadership in the field of Neurodiagnostics in clinical and educational arenas, as well as those with demonstrated service to ASET.

✓ The Theda Sannit Outstanding Educator Award was established in 1990 by the Philadelphia Regional EEG Technologists Association and the Eastern Society of EEG Technologists to honor Theda’s accomplishments and contributions to EEG. In 1992, ASET continued the award on a national basis, recognizing outstanding educators in the field of Neurodiagnostics. Nominations can be made by the ASET membership, with the awardee being selected by a vote of the ASET Board of Trustees. Deadline for submitting recommendations is May 15, 2012.

✓ The Society’s Distinguished Service Award honors individual members for service to the Society and/or to the Neurodiagnostic profession. An ASET member must submit the nomination of another member. In addition to the recognition, the award includes a one-year free membership in the Society. Deadline for submitting recommendations is May 15, 2012.
ASET Awards will be presented at the Annual Business Meeting and Awards Luncheon during this year's Annual Conference August 2-4, in St Paul, MN. Please consider nominating a colleague. Visit the ASET website to view the nominee criteria for each award.

Warm regards,

Judy

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**FROM THE EXECUTIVE DIRECTOR’S DESK**

**Help Us Identify Our Ends**  
*By Arlen Reimnitz*

Over the course of the next five months, the ASET Board of Trustees will be immersed in strategic management discussions and strategic planning. The model chosen by the board for its strategic planning will be driven by “systems thinking.” Under this model a system is defined as “a set of elements or components that work together in relationships for the overall objectives/visions of the whole.” The anticipated outcome of the strategic planning is a roadmap for focusing all of ASET’s systems elements on the attainment of an organization-wide shared vision of member satisfaction within today’s complex and future changing environment.

**The phases and steps for strategic planning under the systems thinking model include:**

1. identification of most critical issues facing ASET and a current state assessment through an internal SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis in the areas of governance, leadership management and administration, internal communication, external communication, and programs and services;
2. external environmental and future environment scanning of socio-demographic trends, competition, ecological, economic, political/regulatory, technology, industry, and citizen trends with a focus on elements that are just beginning to show up and that will likely impact ASET fully in three to five years;
3. identification of desired outcomes (ends and values);
4. identification of key success measures, or ways of measuring systems effectiveness; and
5. identification of solutions, strategic changes and organizational innovations that address system gaps which, if left unfilled, would preclude attainment of the desired outcomes.

When all of the phases and steps have been completed, the end product will be an operational strategic plan – informed by the future scans and critical issues collected – for moving ASET from its current state to the desired outcomes.

Neither the strategic management discussions nor the strategic planning phases will be undertaken in a vacuum. The board, staff, and I will be in need of and asking for your help. Throughout each step of the strategic planning process we will be reaching out to you individually and through collective sampling of members for your thoughts, ideas, assessments, and projections. In addition, so that we can obtain an accurate current state assessment of the Society’s programs and services, we will be conducting a member needs and satisfaction survey. The member survey will be online and will only take a few minutes to complete. It will seek to measure the utilization levels of ASET’s programs as well as rate overall member satisfaction and interest in the Society’s program and services. The survey will include open-ended questions for
you to identify what new programs and services should ASET offer that would be beneficial to you, what changes or improvements you would like to see made to current products and programs, and what new initiatives or endeavors should ASET consider pursuing. We anticipate the survey to go live in early May. The survey results will be heavily relied on by the board as it identifies the strategic plan’s desired outcomes and ends. Therefore, your participation in the member survey and honest evaluation will be invaluable. Watch your inbox and scan the Breaking News section of the ASET website for announcements as to when the member survey will be open.

**TECHNICAL TIPS**

**Troubleshooting Tips for Intraoperative Neurophysiological Monitoring (IONM) For All Audiences including Students, New IONM Staff, Experienced Staff, and Experts**  
*Denise L. Bates, R. EP T., CNIM, MBA*

**ABSTRACT:** The concept of troubleshooting in the operating room (OR) can be a challenging task even for the most experienced professional. We must acknowledge that we all started at the beginning at one time or another—we did not become troubleshooting experts overnight. Effective troubleshooting skills are developed over time, under guidance, and with practice. A need exists to rapidly improve troubleshooting skills to avoid wasting valuable patient time in the OR. Troubleshooting ranges from a wide variety of issues, not solely limited to electromagnetic interference. The field of IONM continues to experience growth and increased demand for services. It is our responsibility as IONM professionals to foster this growth with continuing education and sharing our knowledge with future generations of IONM providers. This paper includes an overview of perceptions, common and uncommon troubleshooting issues, prevention strategies, and tricks of the trade.

**INTRODUCTION**

IONM service providers consist of an eclectic blend of individuals with varying backgrounds. Our field is compiled of individuals with traditional neurodiagnostic backgrounds such as electroencephalography (EEG), evoked potentials (EPs), polysomnography (PSG) or sleep technology, and nerve conduction studies (NCS). Other individuals have strong academic backgrounds and advanced degrees in neurology, neuroscience, physiology, and biology while others yet have left other medical professions and have been cross-trained. Regardless of how we got involved and employed in the field of IONM, we have to recognize that we are a community and we all were new once.

Let’s take a step back for a moment and reflect to our very first IONM experiences. Think about the first time OR experience with the restrictive sterile field, various roles and personalities of the staff, close quarters to share space, conversations with the anesthesia team and surgeon, and managing the IONM equipment. These initial experiences set lasting impressions and either intrigued our interests enough to actively persevere or deterred others out of the OR environment. Now reflect upon the first time you had electrical interference contaminating your IONM recordings when you were sitting behind the driver’s seat. You may have felt overwhelmed, intimidated, annoyed, frightened, confused, or a combination of feelings. Maybe you had someone there to help you or maybe it was after hours and there was nobody to assist. Now
advance to who and where you are today. Remember all those bumps along the road and learning experiences, both positive and negative, that helped mold you into who you are today. We need to remember our own personal and professional evolution and develop effective methods of transforming the new IONM staff members and Neurodiagnostic/IONM students into competent board-certified professionals.

Throughout the years of IONM teaching experiences, both on-the-job encounters and traditional academic style teaching, I have come into contact with many individuals who voluntarily and anonymously provide feedback. The recurring themes among students and newer IONM staff is the fast paced environment of the OR, higher stress levels in comparison to diagnostic studies, and troubleshooting fears. Since the number of board-certified IONM staff is escalating by volumes, this is evidence that signifies the need to embrace their challenges in an efficient manner. Granted the OR is not for everybody, but those who choose to continue with a career in an OR must engage in effective stress management strategies and develop a mentor-mentee relationship with senior staff. Experienced IONM staff and experts in the field with 10, 20, or more years in the field must reflect back on the early days when they were new to figure out what could have made these experiences more comforting. The recurring themes among experienced staff and experts in the field is progressing junior staff up to speed quickly (particularly in the areas of troubleshooting) to improve their competencies and skill sets. Many senior staff or managers/supervisors juggle multiple responsibilities that include but are not limited to scheduling, staffing, and allocating resources. A smoothly running IONM service delivery model is desirable, but this often includes a staff that is up to full capacity from an operations perspective. The key is to recognize that ineffective troubleshooting skills or failure to educate junior staff on troubleshooting techniques costs time away from other service operations. As a profession, let’s strive on improving troubleshooting skills early to help bridge the gap between newcomers, the inexperienced, experienced, and experts.

The goal of this paper is raise awareness within the IONM community that we need to address the gaps among our diversified work force. The specific goal is to provide several recommendations and best practices in the area of troubleshooting that may be valuable to others. Troubleshooting tips may be an area of review for the seasoned professional although tips have potential to provide insight and support for students and newer IONM staff. The bottom line is, IONM professionals must provide safe patient care to assess the neurologic systems and structures at risk during various surgical procedures. Eliminating artifacts, basic troubleshooting, developing or improving troubleshooting skill sets, and bringing our workforce current on troubleshooting knowledge is an effort to standardize the basic knowledge in IONM.

**TROUBLESHOOTING**

When many IONM professionals hear the word “troubleshooting”, many equate this with electrical interference or 60 Hz artifact. Although this is true in some cases, troubleshooting is multi-spectral and an essential skill required when obtaining clearly resolved waveforms. The problem in the OR is that time is of the essence. As soon as a problem is identified, troubleshooting steps must be initiated immediately. Otherwise, time is wasted and the next thing you know, the exposure is finished. The last thing we want to do is fail to provide the surgeon with baseline findings. Aside from assessing pre-operative baseline latency and/or amplitude asymmetries or absent signals, we also want to know if any electrodes accidentally got dislodged during positioning or if inadvertently the left and right sided stimulators have been swapped. The list of possibilities is endless of things that can go wrong during patient positioning, particularly in the prone or lateral positions. Waiting for the exposure to be complete may lead to unnecessary crawling under the drapes with limited visibility to make adjustments. Granted there are times
when the room moves extremely fast during emergencies or traumas forcing you to collect baselines in between the cautery during exposure. The general idea is to use your time wisely and exhibit meticulous attention to detail. Place a substantial amount of effort into creating an orderly set-up and pay close attention to how you run your cords and cables. A sloppy set-up that disregards the proximity of your recording electrodes to the power cords of other machines in the OR may result in you picking up electrical interference. Words of advice to avoid noisy baseline recordings include, be certain to plug your equipment into an outlet that is grounded and, if possible, one that has nothing else plugged into it. Do not plug equipment into extension cords or multiple outlet receptacles found on IV poles. Keep the IONM cords away from non-IONM OR equipment. Be sure to unplug OR equipment that is not in use such as a fluid warmer on a nearby IV pole. Try turning off and unplugging the OR bed itself, fluid warmers, body warmers and other similar equipment when possible. Take advantage of the “raw sweeps” or “live feed” to determine the source of noise. Never start out using the notch filter or 60 Hz filter. You want to save the filter as a last resort after all possible troubleshooting for noise steps have been taken. Avoid the use of smoothing and other software features to improve the visual appearance of the waveforms. You must realize that when you smooth data or use the notch filter, you are actually altering the data. Whether the result is subtle or dramatic, you should approach this with caution.

Here are some general pre-recording tips to achieve clearly resolved waveforms. Be certain to select a nice muscle to place your ground electrode. Avoid placing the ground electrode near bony protuberances such as knees and bony shoulders. Bone is a conductor and you may pick up vibration from the drill. Remember in diagnostic studies, you want to place your ground electrode between the stimulating electrode and the recording electrodes. When placing your recording headset for somatosensory evoked potentials (SSEPs), consider braiding the electrodes, binding them, and then wrap the ground electrode around the entire headset. This helps minimize the electromagnetic field and accentuates the signal quality. Exercise caution and be very meticulous when you secure your recording and stimulating electrodes on the patient. Be careful with the tape that is placed on the patient. Many people like to fold small tabs at the corner of the tape for easy and fast access to tape, however, when the patient is positioned, that tab can peel back causing the needle to become dislodged. We don’t want anyone to get stuck by one of the needles for obvious reasons. In hospitals that have a slower paced OR setting, take advantage of the extra time by creating stress loops in your electrodes. Instead of getting tugged one time, this allows you two times of being tugged before the electrode will actually dislodge.

Next are some tips during the recording phase and especially the baseline collection. Large IONM set-ups require the use of numerous electrodes, both stimulating and recording. Despite best efforts, particularly on cases with pre-flip baselines and post-flip baselines, it is possible to plug electrodes into the wrong receptacles. Check your impedances and determine if an electrode(s) has been dislodged and has acceptable impedance. If the impedance of one or more of the electrodes indicates that you will get a variety of notifications such as a red color, impedance limit, or some other indication of the electrode being “out” or “missing”. Remember that the impedance is checking the recording electrodes, not the stimulators. Technically speaking, you could plug a stimulator into the recording receptacles to check impedance; however, this is not practical. Despite acceptable impedances, beware that recording electrodes can still show a reasonable impedance reading if they are partially dislodged. The most common sign of this phenomenon is noting significant interference in all channels that include the same electrode, such as C4 for example. Every one of the channels that include C4 will have significant interference. Note that sometimes a dislodged electrode may show acceptable impedance. When this occurs, simply go to the head of the bed and visually inspect the electrodes. The lesson here is recognizing the limitations of your monitoring equipment and not to become heavily dependent
on the equipment notifying you of a dislodged electrode. Sometimes you simply need to take a
look under the drapes for the non-obvious problems.

If it seems like you have exhausted all these troubleshooting measures and efforts, try changing
settings and parameters. Change the stimulus rate to another rate. For example, if you have noise
at 4.7 Hz, consider trying, 4.1 Hz and other variations within the recommendations of the
guideline settings. You may need to reduce the high frequency filter or increase the low
frequency filter. You may need to allow for additional averages or trials to improve the signal-to-
noise ratio. In extreme circumstances, and out of experience, there are even times when you need
to unplug your equipment from an outlet and move to another electrical outlet. Sometimes this
requires you to move to another location in the room, although rare. Always be sure to document
your troubleshooting steps, results, and techniques within the record or logbook. Be certain that
the interpreting physician and surgeon are aware that the IONM data has interference and that
you are actively working to resolve the issues. You do not want the surgeon(s) to be under the
impression that the IONM team has ideal circumstances when in fact there are troubleshooting
concerns. Make sure you look for error messages or unusual equipment behavior to rule out
equipment issues. When in doubt, always shut down the system, wait 60 seconds, turn the system
back on, and resume the usual booting/starting up sequence.

If you are in the middle of a case, never assume that a stimulator or a recording electrode cannot
dysfunction. Sometimes at the worst possible moment, a stimulator may fail. Be sure that you are
familiar with your systems warnings, notifications, and indications of a problem. For example,
know what stimulator artifact looks like – know what it means if you get an “X” or a red light
display on your console. Be sure you are capable of reassigning stimulators or recording
electrodes to another input to test for an input failure or dysfunction. Effective training and
troubleshooting lessons are necessary to improve these skills, although rare or atypical system
errors may occur. Be sure that you are able to readily identify signs or suggestions of potential
problems when looking under the drapes. If you notice that the height or angle of the patient’s
arms are not the same, and you have observed a decrease in your ulnar SSEP for example, be sure
that you work with the anesthesia team to recover the SSEP. This may involve repositioning the
arm, adding foam padding, tightening the bolt on the bracket the arm holder seeds in, among
other possibilities. Make sure you notify the surgeon(s) of positional issues and that you are
working with the anesthesia team to remedy the issue. Be certain to document all the activities
that were performed in the recovery of the signal. Padding and cushioning of the chest pads may
migrate into a patient’s brachial plexus creating pressure. Excessive motion in the field over the
course of long hours may result in the patient’s own body weight placing pressure on extremities,
such as the ulnar. Picking up changes immediately and trying to figure out what could have
happened is imperative for IONM. Sometimes a patient’s leg may slide off the table leading to
the patient’s common peroneal nerve being compressed by a mayo stand. The possibilities are
numerous and not always obvious.
Welcome from the Interest Section Coordinator
By Margaret Hawkins, R. EEG/EP T., CNIM

The ASET Executive Office receives many inquiries about Board Exams, re-certification and CEUs. So this quarter we asked our Interest Section Leaders to share with you tips, tricks, advice, warnings, and guidelines having to do with credentialing and keeping informed and up-to-date in our field. It is ironic that employers increasingly are hiring only Board Registered/Certified technologists to fill available positions at the same time they are cutting back on travel and education funds. And this is taking place as the credentialing organizations are requiring proof of continuing education to maintain those employer-mandated credentials…It is frustrating and challenging to keep up and keep track! As I prepare to take the CLTM Exam, I can attest to everything written in these articles—I know I am going to change some things I’m doing and do some things I haven’t done yet! If you are thinking about taking a Board exam, start studying today. If you are renewing your credential, add up your accumulated points as of today; if you are coming up short, do a Journal Quiz or register for a meeting today. If you don’t need CEUs, read a Journal article anyway, study a chapter in a newly released neurodiagnostic textbook, ask a colleague a question…Whatever you do, don’t stop learning about this fascinating field of ours!

Acute/Critical Care Neurodiagnostics
By Sara Batson, R. EEG/EP T., CNIM, CLTM, RPSGT

Well, I can only tell you what I have experience with so I hope it helps. I’m told by a couple of close friends I am a glutton for punishment because I took three different board exams in one year.

To prepare for board exams it is vital to understand the material you are being tested on. One of the ways to prepare is to look in the handbook provided for the board exam. In the back of the handbook is a list of recommended books and reading sources that have been used to obtain the material that will be found on the exam.

Also located in the handbook are a few practice questions as well as a source listed to take an online practice test. There is a fee for this but I recommend it because after completing the practice test you receive immediate results in a format similar to what is received after taking the actual board exam. This can assist in preparing for what areas may need to be concentrated on more so than others. Yes, it is crucial to study everything but understandably we all have areas that we comprehend better than other areas.

Most techs cannot afford to purchase all the books listed. The price of books can be quite expensive. One of the things I did that was suggested to me by a senior tech was going to the hospital library where I work and checking out a recommended book. I found by doing this if the specific book you are looking for is not available; the hospital library has a system to borrow the book from another library. Allow for a few days to get the book. Don’t expect to have it instantaneously. I also borrowed books from the neurologists that I work with, so I recommend asking them too. I found they have a lot of the books recommended on the office shelf or at home.

ASET is another great resource for obtaining information to prepare for the board exam. Generally the recommended reading sources that are not books come from journals, either past AJET articles or articles from the Journal of Clinical Neurophysiology. I have purchased electronic copies, hard copies, and audio formats. I encourage techs to look in the ASET online store for the articles listed in the back of the board exam handbook. ASET has a wealth of information and sometimes it cannot all be listed online. If it is not listed in the ASET online store, contact Lucy Sullivan (lucy@aset.org), ASET’s Director of Publications. I personally have
found over the years, either preparing for the boards as a student or a graduate working in the field, everyone in the ASET and ABRET offices is very nice and willing to assist a tech in any way they can.

If the article is from a journal other than the American Journal of Electroneurodiagnostic Technology (now The Neurodiagnostic Journal) and is not available through ASET, I have looked for it on online through search engines. Sometimes it is available for free and sometimes it is not, or I could not find it at all. In that case, again I spoke with the neurologists I work with, especially senior technologists that I have networked with. For the most part someone usually has the article or knows where to get it.

Networking in our field is key. I cannot say enough about the need to network. Whether looking for an article or having a question regarding material being studied, fellow technologists are willing to assist each other. This is such a small profession that it is essential to network. I have made great friends, not just colleagues, in the field by attending conferences at the state, regional and national levels, such as Illinois, Iowa, and Indiana state societies, the Central Society comprised of several Midwestern states, as well as ASET. I know there are other societies in areas throughout the US and though I have not attended any of them I highly recommend for you to seek out the society in your area. I feel fortunate to know great techs in the field that I can call or email asking for a simpler explanation regarding a question or area that needed more clarification for me to understand it. This does not mean you are stupid, it simply means you are brave enough to ask a question everyone else is wondering about too.

Little things I learned from TRiO while going through the Neurodiagnostic program at Scott Community College were only write on one side of the note card, use colored note cards instead of white because the brain remembers colors better. With that being said, I use different color ink pens and highlighters when I am rewriting information or taking notes. Snack on cheese and a mixture of pretzels, nuts, and chocolate when studying. Drink water, not soda pop. Take breaks while studying, the brain can only be jammed full of so much information at one time and retain it. Make sure you get a good night sleep the night before the exam and eat a good breakfast the morning of your exam. Before the exam starts do a “mind dump” write down all the formulas, drawings, and mnemonics or whatever else you have memorized for the exam so you have it fresh now and not doubting yourself later. While taking the exam remember to relax and breathe. You may think this is weird to add in here but I found out it is very common to hold your breath when anxious and tense without even being aware of it. So, when I come to that question I just don’t understand and I start thinking what is it even doing on this test, what are they asking me, or looking for, my thoughts are going a mile a minute. I’m getting all worked up. I remind myself I need to take a couple of deep breaths and relax.

One thing I have not been able to do but everyone tells me to do is to stick with your first answer. I have a habit of going back and changing my answers because I read too much into it. Sometimes if it is multiple choice questions, it is the closest or best possible answer if the exact answer doesn’t seem to be listed. I like the new electronic testing because of the ability to tag an answer I am not sure of and go back and look at it later. I did not care for the paper version because the lines would blur together and I had to use the answer sheet horizontally to keep them in line and make sure I didn’t leave one unanswered. The electronic version warns you before ending the test if you have unanswered or tagged questions.

I have an hour long drive to work and home, and it was the same when I was in school. I felt like I was missing out on valuable study time, so I purchased audio information that I could listen to while driving. Some of it I was able to repeat word for word almost by the time I took the exam because I heard it so often. I found webinars to be great to play over and over again. You have the ability of seeing and hearing which aids in learning. Also, don’t forget there are available board prep seminars that can be attended throughout different areas of the country. And hopefully there are fellow techs preparing for the exam at the same time to have study groups.
whether in person, or via phone, or electronic chat. I hope some of this information helps. Good luck studying and test taking!

**Ambulatory Monitoring**
*By Jennifer Carlile, R. EEG T.*

The theme for this newsletter: *Sharing some advice regarding studying tips, best resources, warnings, etc. when preparing to take exams.* Most important: be prepared. I am a bit old school when it comes to studying for any type of exam. Usually I put together an outline of what I need to cover, and then jump in with both feet. Review everything first that you feel you have a good knowledge base about, just for a refresher, then, hit the books for the more difficult subjects. The key is using all resources that are available. The Internet has endless resources to draw upon, networking with fellow colleagues and physicians. And finally before taking the exam, without sounding like I am in need of a 12 step program, I like to have a glass of wine just to calm myself and remain focused.

Now for the “good” stuff...a case presentation to share with you. Patient history: 28 year old female with a history of seizures since early childhood. Seizures consist of screaming, running around, hides then becomes combative. Postictally the patient is confused, tired, wants to sleep, and usually takes a few hours before patient is more like her normal self. Patient is mentally challenged, lives in a group home, and has no family to give further details on her history. Medications include levetiracetam and carbamazepine. Patient was ordered to have a 4-day Ambulatory EEG with video, to capture any possible nocturnal seizure activity and to determine if these episodes documented above are seizure related.

![FIG. 1. Patient is sleeping. EEG looks fairly quiet. No interictal discharges noted on this page. Pay attention to the EKG in the next example.](image-url)
FIG. 2. Screen display changed to a 30 second view instead of the standard 10 second display, highlighting the patient becoming tachycardic.

FIG. 3. Note the EKG returns back to a normal rate.
Why are these three examples important? The patient had 4 episodes exactly the same where she aroused, became tachycardic then within a matter of a few seconds, the patient started having spike discharges, independent left and right temporal (see below). Unfortunately, I cannot share the video images with you, but I can describe during these 4 episodes, the patient wakes up, looks around, fumbles with her blankets, then lies back down and closes her eyes.

**FIG. 4.** Independent left and right temporal spikes.

Finally three days into her monitoring session, the patient while asleep, had another episode of tachycardia followed by independent, bitemporal spike discharges and the video displays the patient sleeping, covered with a sheet and blanket, arouses, followed by fumbling with her hands under the blankets (clearly visible even though she is covered), and begins to moan. No tonic-clonic activity noted. Her caregiver comes into the room, questioning if she is okay. Patient is unresponsive, just lying in the same position, the caregiver moves the blankets just enough so that the caregiver can see the patient (clearly not remembering we are recording audio and video). The caregiver continues to call her name and ask if she is okay. The patient begins to move both legs (restless like) and her right hand as if she was waving to the camera under the blanket. The caregiver then covers the patient back up and walks out. All the while, the patient is in a full generalized seizure, still not responding to the caregiver. After two minutes of this, the seizure finally subsides and the patient jumps out of bed, confused, looking around, and begins to pull off all electrodes. Finally when the caregiver comes back into the room and electrodes are off the patient’s head, the patient becomes combative with the caregiver.

I wanted to share this case presentation with you to call attention to how some patients can have tachycardia with no changes to the EEG, but then when the EKG returns back to normal, interictal discharges begin to happen. And finally I wanted to emphasize instructing all caregivers, on all shifts, on what **not** to do while a patient is being recorded on video. What the caregiver should have done as soon as she walked into the room after hearing the patient moaning, was to pull back the covers all the way, exposing a clear view for the video monitor. Continue to call the patients name, if the patient is verbally unresponsive, ask the patient to squeeze her hand, if the patient is still unresponsive, stay with the patient until the patient is
responsive. Do not cover the patient back up and walk away. Honestly, I wish I could share the video images with you but when I saw this I knew I had to communicate the importance of instructing the caregivers to pass on all detailed instructions to the other shifts of nurses or caregivers.

**Computers in the Workplace**  
*By Brian Markley, R. EEG/EP T., R.NCS.T., BS*

Do you know what a group policy is? …In the computer, rather than insurance, sense? Network administrators use group policy to manipulate the computers connected to their networks. Group policy is a feature of Windows NT (and its successors). It is often desirable to limit what users can do with their computers. Sometimes this is done for security reasons. Sometimes it is to make supporting the network more manageable.

In some cases those users may move from computer to computer. If you have set up an application (or several applications) exactly the way that works best for you, you would like to have the settings follow you to whichever computer you happen to be using. We have several physicians who work at multiple offices. A solution to this issue is something called a “roaming profile.”

A profile is simply the collection of settings and data for an individual. In a Windows XP PC the settings are stored by default in the folder: *Documents and Settings*. In Windows 7 these files are kept in the folder: *Users*. The profile is typically labeled with your login name. A profile contains application data as well as things like your personal documents folder (*My Documents*), your desktop, and favorites. Photos and music folders are also located in the user profile.

In the case of the roaming users, with Group Policies applied, the profile can be redirected to a common source, sometimes to a folder on a file server.

My group’s project to implement an electronic record is continuing to progress. We now have the first doctor starting to chart patient encounters. For the moment we continue to process our Neurodiagnostic testing reports through our transcription service. While, as we have discussed in previous columns, there are no forms for Neurodiagnostic testing reporting in the clinical content, we will be ultimately importing the reports to the charts as .pdf files.

As always, please let me know if you have any comments or suggestions for future posts. My e-mail is bam@neurologycenter.com.

**CPT® Coding**  
*By Lynn Bragg, R. EEG/EP T.*

There are times when I receive the suggested topic for the newsletter, I think how in the world do I relate it to CPT® coding. This time I’m confident that those who are certified coders must keep up on their CEUs as do so many of us.

In the good old days, regional societies would have annual meetings on a Friday or Saturday and in one day you could earn six to eight credits for a nominal fee of usually less than fifty dollars for the day including breakfast and lunch. What a bargain! Most of those attending had their tuition paid for by their employer. Now with the economy, an education budget is nonexistent in most facilities in a time when continuing education is required to keep your registry.

The ASET journal is a great resource for ACE credits but can be a timely process for the required credits. I have noticed that there are several resources for free or very reasonably priced continuing education credits for ICAVL (carotid duplex ultrasound) all available online. Often times you are able to earn five to 10 credits in an afternoon.
The ASET Annual Conference has such a diverse program during their courses. It’s unfortunate that many of the members are unable to take advantage of these. Perhaps there is a way to incorporate these courses into articles that members can access on the website to read and answer questions much like in the journal. Seems like this could be a great resource for all technologists especially those who have limited access to educational material for preparing for their board exam. This would allow technologists to get their credits on their own time.

The webinars are amazing and very cost efficient but often the time restraint can make it hard for some to attend. You can purchase the webinars after the presentation date to view at your convenience.

I remember when studying for my boards, I got the practice exam offered by ASET, immediately took the exam and failed miserably. While checking what the correct answer was, I found out why the other answers were incorrect. In my research, I would find terms that I knew would be important for my study guide. It was amazing how fast my study guide grew.

ASET has a wealth of information available on their website and if you can’t find it there, the staff will hook you up with a member that can help. It’s as easy as a mouse click or phone call.

Good luck to all who are taking a board exam this year.

Department Managers
By Stephanie Jordan, R. EEG/EP T., CNIM, CLTM

The ASET executive office gets many calls from technologists regarding two critical issues for our chosen career:

1.) How to best prepare for the ABRET exams?
2.) Once credentialed, how to keep that credential with CEUs?

I have taken two ABRET exams in the recent past (2009 LTM and 2010 EP) and am happy to share the formula that I used to prepare myself.

a.) Print the handbook from the ABRET exam website. Use the list of Tasks Performed and Knowledge Applied to check off things you know against things you need to brush up on. The list may look daunting but you will find some duplication so cross out duplicates. It looks easier already! I then use the list of reading resources for the items I need to brush up on. If you don’t have time to read the entire book then look through the chapter contents for what you really need help with.

b.) Memorizing the American Clinical Neurophysiology Society (ACNS) guideline for each particular field is a must.

c). Make flashcards and review them as often as possible. Try to do this at the same time each day so it becomes routine.

d.) Use all the resources you can think of: physicians’ libraries, ASET publications (newsletter and journal articles), peers, the Joint Commission website, neurodiagnostic chat forums to access information on any remaining items from your list.

Once you have earned your credential (I know you will!) how to keep it?

Meetings are certainly a great way to network and collect CEUs but are not affordable for everyone. If your hospital or medical center does not help provide funding for continuing
education, try applying for it through your union or philanthropy at work funds. You could incorporate attendance at a meeting with your vacation plans. I look forward to hearing how other members accumulate CEUs. We always joke about holding a car wash and bake sale but maybe that is not such a bad idea! Best of luck!

By Pat Lordeon, R. EEG T.

At Children’s Hospital of Pittsburgh of UPMC we have prepared many techs over the years to take the ABRET EEG board exams. When we have a group of techs who are ready to begin preparing for their exams, we follow the same process each time. First, we advise the candidate to organize, organize, and then re-organize their material. Most of these techs have gone through our internal training program, and have binders full of notes and handouts, in addition to several textbooks. Getting things categorized and arranged in a coherent fashion goes a long way toward de-mystifying the studying process.

The next step is to have the candidate assess their strengths and weaknesses. We ask them to do a quick overview of their material, and determine which areas they feel comfortable in, and which could use some polishing. We suggest that they set aside a period of time each day to do nothing but study. This time is sacred, and should not be compromised on.

Once the techs have gone over their material, we begin offering Board Review sessions. These sessions usually last about an hour each, and can vary in format depending upon who is conducting them. The format I prefer is to ask questions in a roundtable fashion, with each person having an opportunity to answer the question until someone gets it right. Then the next person gets a new question, and we go around the table until someone gets that one correct. I ask the questions verbally, using old test materials as a guide. The thought process is that if you can answer a verbal question without seeing it on a piece of paper in front of you, you can certainly answer it when you are able to read and re-read it during an exam.

While we are doing these Board Review sessions, someone is keeping track of the questions or topics the group is having trouble with. We then schedule additional time to do “re-teaching” sessions. This prevents the review sessions from turning into instructional hours, and allows us to cover more material in the allotted time.

If we have techs who are preparing for their Oral Board exams, we do all the above in addition to having them measure the manikin head and check their measurements many, many times. The candidates must also spend time with the R. EEG T.s in the lab having individual reviews of the EEGs they are using for the Record Review part of their boards. Additionally, the senior R. EEG T.s in our lab organize “mock board exams” which mimic the format of the ABRET oral exam.

All of this requires a pretty hefty commitment from the rest of our staff techs, but the reward lies in seeing our own junior staff grow and advance professionally. We are only as good as our weakest link, and helping our junior techs achieve their registry improves our group as a whole.

For those of us just interested in keeping our skills sharp, CEUs are an ongoing struggle. Because of the expense involved in traveling to a meeting, the option most techs in our lab prefer is to complete the quizzes in each volume of the Journal. The key is to do this every issue. That way, although the number of CEUs you accumulate per quiz is small, overall the amount is steady and cumulative.

The best advice is to persevere. Don’t stop, don’t get discouraged, and don’t despair. Keep plugging away. Focus on the next step, not the end goal. Celebrate every successful step. And keep this in mind: “There is no happiness except in the realization that we have accomplished something.” Henry Ford
Studying for ABRET exams is probably one of those experiences that tend to overwhelm all of us techs! I spent many sleepless nights trying to figure out where to begin to study for my CLTM Exam. Author Bruce D. Friedman in his book, *How to Teach Effectively, A Brief Guide*, describes four basic types of learners: Visual, Auditory, Kinesthetic, and Read-write. I have used this information on my own studying as well as my teaching technique as an instructor for an EEG program. I will start by sharing my own experience preparing for my CLTM Exam. I will then wrap up sharing my experience as an instructor, and the techniques I have used in my classroom to ensure the successful delivery of the material to my students.

The visual learner is one who learns better by the use of graphs, charts, pictures, and demonstrations. The auditory learner is one that learns by listening and verbalizing the information. The kinesthetic learner learns best through hands-on approaches, while the read-write learner will process information better by reading and writing it. All of us are a combination of all types, but there is usually one type that will dominate, and that would be the one that we need to use to our advantage. What type of learner are you?

Some of the rules that I promised myself to follow in order to obtain my goal of passing my boards were:

1. Do not leave the study time for the last minute. This is a major indication that this test is not a priority in your professional life.
2. Prioritize material according to your level of knowledge. If you feel that you have a good understanding of a topic, move on to the one that you have not been able to understand and dedicate more time to it. This might mean contacting mentors/seasoned techs that are willing to help explain the concept.
3. Understand the concepts instead of trying to memorize them. When you understand what you are trying to learn it becomes much easier to remember it.
4. Maintain a positive attitude at all times.

My personal learning style is a combination of visual and read-write. With this information about myself, I then started attending many courses pertinent to the CLTM material. ASET offers great courses, including online, as well as articles and reading material that are well worth reading. These courses not only helped me to pass my boards but have also become my biggest source of continuing education credits. I also bought a good Neuroanatomy book. On a giant wall post-it paper, I drew the lateral aspect of the brain with its convolutions, and indentations (gyri, sulci). I identified lobes, and highlighted all areas of the brain. I then wrote on each area the full description of a clinical manifestation of a seizure originating in that particular area of the brain (seizure semiology). This activity was not only fun but provided me with a visual image of all the written information. I also used another giant post-it to write all the childhood epilepsies and syndromes, including catastrophic epilepsies. I read this information out loud daily. Another good resource was the MRI lab in my hospital, where I was able to discuss brain images with different types of lesions with the MRI techs in order to understand their structural-functional correlation in the brain. I was able to visualize the different imaging techniques.

When I first started teaching, it wasn’t long before I realized that not every student in my classroom was able to understand the material based on my own personal learning style. I found myself driving home after teaching, brainstorming on ideas to deliver the material in a way that all of them would understand it. I decided to incorporate many ways to deliver the same information. For example, when discussing the polarity convention, I made them state it out loud.
I also showed them ways to remember it by drawing a chart. On EEG samples, they would have to find a focus and use the polarity rules to determine its type and origin. The number line and pictures of the brain showing different input voltages by regions were all additional teaching techniques that I used with the students to help them understand and apply this fundamental concept. It was fun to hear some students saying “I got it” when using one technique, as other group of students echoed the same phrase after using a different learning technique!

In summary, both of my experiences as a learner and instructor have been very rewarding to me. The feeling of joy that you experience when you have full understanding of a concept, and the one that you experience when all your students achieve a full understanding of the class material is indescribable! If there is something I learned; persistence, disposition, and determination are three of the most important attitudes not only when trying to pass your boards but in every aspect of your life!

By Cheryl Plummer, R. EEG T., CLTM, BS

In December, I attended the annual American Epilepsy Society meeting. It was a great meeting and I learned many new things that I would like to pass along to all of you.

One of the very hot research topics is looking at high frequency oscillations in epilepsy. There were many papers and posters regarding this. The instruments that we are using are very sophisticated and we have the ability to record at high sampling rates. There should be very interesting research coming out regarding this.

I also learned about two new anticonvulants: Onfi™ (clobazam) and in Canada this is called Frism®. This medication is used “for the adjunctive treatment of seizures associated with Lenno-Gastaut syndrome (LGS) in patients two years of age or older.” Onfi™ is a benzodiazepine. The side effects include increased somnolence or sedation, withdrawal symptoms if stopped rapidly, physical and psychological dependence, (therefore patients with substance abuse should be monitored closely) and lastly suicidal ideation. For more information regarding this medication, consult the website at www.onfi.com. Keep in mind that because this is a benzodiazepine it could induce fast activity on the EEG.

The second medication is Sabril® (vigabatrin). Sabril® is as adjunct therapy in adults with refractory complex partial seizures who have failed several other alternative medications and where the benefits outweigh the risk of the side effects. It is also used as monotherapy in children one month to two years with infantile spasms where again the benefits outweigh the side effects. The side effect that Sabril® causes can be permanent vision loss in infants, children, and adults. To learn the details of the side effects and to read more about this medication, you may visit the website at www.LundbeckSHARE.com.

I also wanted to share some information regarding an organization that had a booth at the meeting as well as did a presentation, called SUDEP Aware. This is an organization that is working to raise awareness in people with epilepsy and to encourage them to talk to their health care team regarding this with the goal of trying to reduce their risk of sudden unexplained death in epilepsy (SUDEP). It is a very interesting and wonderful idea. They have a website www.sudepaware.org. There is also a book available that shares stories of families and presents some of the experts’ information on SUDEP. You can access information regarding this on the website. I hope that you will all take a little time to read about this organization.

One last thing, I would love to get information from those of you out there who would be willing to send me your labs’ criteria for what to save in a 24-hour study without events, how much before and after you save of the video when there are events, and lastly do you save all of the EEG data on all patients. If you would like to share this information, I will happily compile and in the next newsletter I will summarize the information (not including any organizations’ names of course). Thanks in advance for any info you would like to share.

plum1960@hotmail.com
Well, I hope you have all survived this winter (it is almost over!!!). Here in Pittsburgh we have been very lucky and have had a very mild winter. For those of you who have not, it is coming to the end.

Till the next time.

**Intraoperative Neuromonitoring**

*By Justin Silverstein, CNIM, R.NCS.T., CNCT, MS*

This has been a busy week for me. This week I have monitored 11 surgeries, I am dealing with the behind the scenes administration for the practice I manage, I began teaching for an intraoperative monitoring certificate program, and I am giving lectures to a private group that I teach; and when I thought it couldn’t get any busier, my colleague and co-interest section leader Ryan Lau asked me to fill in for him for this quarter’s newsletter article. And let’s not forget the five year old, four year old, and two year old I have at home along with my wife. Does this type of life sound familiar? This week was not that different than last week with the exception that last week and for weeks before I have been preparing for a board exam. We are all so busy, especially in intraoperative monitoring and the hours we keep; we constantly juggle life and all it throws at us. How do we juggle life and prepare for the board exams?

I actually decided at the last minute in January that I wanted to take the Evoked Potentials board. I did this thinking “I have my CNIM; the EP will be a walk in the park.” That thought process could not be farther from the truth. In fact, when I began to study I realized how much information is out there for clinical evoked potentials and some of that information is different than what we may use in the operating room. Either way, I committed so now I needed to ante up the time to prepare for the exam.

The last test I studied for was my CNIM, which was almost six years ago, so I was a little rusty. However, I realized that time management and not wasting any free time was the only way to work full time and pass these exams; since most of us do not have the luxury of taking excessive amounts of time off to study. I also follow a set of rules, that I call my “life rules”; one of these “life rules” includes not working on weekends unless I am on-call. There has to be balance between work and play, as well as career and home. So in order to not disrupt my life completely, still follow one of my “life rules” and put in adequate study time, I utilized as much down time as possible to study during the week. And as all of us intraoperative monitoring clinicians are aware, there is so much down time in a day of surgery that if utilized correctly could have major benefits. Studying during the downtime worked when I was studying for the CNIM and it worked for me this time. I would keep my study material on me and would study before cases, between cases and after cases. On days I was not in the OR, I would get to my office an hour earlier than I needed to so I could crack the books and leave an hour later to do the same. Everyone learns differently and being an educator, I have come to the realization, that what works for some may not work for others. I knew with myself that I am able to study and retain information by focusing on material for a short amount of time and revisiting that material as I progress with my studies.

Speaking of staying focused, how do you focus when there is so much information that has been published on IONM? ABRET lists 26 references with 18 of them being textbooks for the CNIM exam. How do you focus? I focused on the EP by reviewing the American Clinical Neurophysiology Society (ACNS) guidelines and reviewing some (not all) of the source material and taking the online practice exams ABRET offers. The practice exams are good because they put you in a timed situation where you are doing the test on a computer, much like the actual exam. That is really the only benefit you get from the online exams. Unfortunately when they grade you, you do not know what specifically you got wrong. For example, the CNIM is broken down into 4 domains (Preparation and Application of Fundamental Concepts, Intraoperative...
Phase, Post-Operative Phase, and Ethics and Professional Issues). After you complete your online exam, it will give you a grade and then a break down on how you did in each domain by percentage (much like the real results). However, this does not give you any insight to where you may need specific help. I would have to say the grading is sensitive as opposed to specific. For example, if the intraoperative phase domain is worth 66% of the grade (as it is on the actual test) and you obtain a 36% on the domain, you obviously know you need to brush up on what is going on while you are monitoring however, you don’t know if you bagged all the BAER questions and got all the SSEP questions correct or vice versa. So utilize material such as practice exams as a tool to aide you in the entire experience of preparing for the test.

Once I was confident in the material, I decided to attend a weekend board prep course. These courses are great if you already have the foundation. However, a board prep course will not help you pass the exam if you have not studied and are not really prepared for the exam itself. Board preps focus you on the information that you are going to be tested on. Staying focused is the key, because with so much information available, it is easy to get caught up in a chapter of a text book that is irrelevant to the exam.

So for closing thoughts; stay focused, utilize your time wisely, use what works best for you with regard to studying, and use the wealth of material wisely. For those colleagues who are taking the exams this testing period, good luck!!

Magnetoencephalography
By Hisako Fujiwara, R. EEG/EP T., CLTM, RPSGT

I am pleased to have this great opportunity to introduce myself from past to current in clinical neurophysiology field. During my undergraduate courses at Kyoto University in Japan, I became very interested in clinical neurophysiology, especially in electroneurophysiology in the field of epilepsy. After graduation, I worked at the Kyoto Prefecture University Hospital as a medical technologist. I worked in various laboratories including biochemical, blood, and physical tests. This was a very interesting experience and I had the opportunity to learn about a number of the human body systems with so many different kinds of disease and syndromes. However, my primary interest in clinical neurophysiology did not waiver.

I decided to move to the United States to focus on my interest. I enrolled in the Electroneurodiagnostic (END) Program at Kirkwood Community College. During the course work, I trained at the University Iowa Hospitals and Clinics (UIHC) in EEG, evoked potentials (EPs), electromyogram (EMG), nerve conduction study (NCS), intraoperative monitoring (IOM), and sleep studies including polysomnography (PSG), multiple sleep latency test (MSLT) and maintenance of wakefulness test (MWT). I earned the registration (R. EEG T.). While I was a student, I had the opportunity to learn about magnetoencephalography (MEG).

After graduation, I worked in the sleep laboratory at UIHC for a year and earned the RPSGT credential. I decided to stay in United States to focus on my interests and learn about MEG. I found the opportunity at Cincinnati Children’s Hospital Medical Center (CCHMC) to learn more about MEG, where I have been employed for about six years as a level three, Quantitative EEG/MEG technologist.

My current role as Quantitative EEG/MEG technologist includes acquisition and initial analysis of clinical MEG data for noninvasive epilepsy presurgical evaluations (Phase I) as well as the support for design of paradigm and acquisition for clinical research MEG studies. For the clinical MEG studies, I have published a manuscript entitled “Ictal MEG Onset Source Localization Compared to Intracranial EEG and Outcome: Improved Epilepsy Presurgical Evaluation in Pediatrics” in Epilepsy Research, a peer-reviewed journal. Also, I have collaborated/contributed to nine articles. In addition to this role in the MEG field, I have been working the analysis of high frequency brain oscillations (HFOs), which is a cutting-edge
research topic in epilepsy surgery worldwide, to localize the seizure onset zone in intracranial EEG recordings for invasive presurgical evaluation (Phase II) and functional mapping for motor control and language.

I look forward to working with other MEG technologists both nationally and internationally to share our interests and expand our MEG field.

“Every day of life is a Learning Experience”

Nerve Conduction Studies
By Jerry Morris, R.NCS.T., CNCT, MS

Tests, tests, tests…..During college and graduate school it seemed that a day didn’t go by that there wasn’t a test to take, sometimes more than one a day. Even though I liked to study and found it fairly easy to do so, test taking itself was a gut wrenching, coffee fueled, sweat pouring day-to-day occurrence. The scheduled tests were tolerable—it was the dreaded “Close your books, take out a sheet of paper, and get ready for a pop quiz” that struck fear in my heart! And I especially hated True or False tests….so much could make something true or false or both. Even defending a thesis was easier, much easier. With my gift of gab, talking about what I had researched and done for two years was a walk in the park.

Fast forward a couple of years, I am now performing NCS and the first NCS exam is about to be given—over 30 years ago. My gosh, has it been that long! My employer wanted me to take the exam so I signed up for the AAET exam to be given in Philadelphia at their annual meeting. I thought I was through with tests after college but this one got my attention. Fortunately I passed it and realized a new career was beginning for me.

Studying to take the first test presented some interesting problems. No one had ever taken the exam before; we were the first “lab rats” so to speak—so there was no one to get any input from. We had Dr. Goodgold’s book and Smorto and Basmajian’s book and AAEM (now AANEM) minimonographs and whatever input we could get from other techs. We had helpful MDs from Mayo Clinic, Cleveland Clinic, UMass, and Florida. Most of my studying came from those books with some tutoring by my MDs. I did as many NCV studies as I could do hoping that my technique was acceptable to the examiners. Practice didn’t make me perfect but it sure helped me gain confidence and provided an invaluable learning tool.

Today, with the advent of the computer age, information is a keystroke away. Again fast forward, this time 25+ years. Today there are two excellent exams to become registered in NCS. The first and oldest exam is given by AAET, the organization devoted solely to NCS and EMG. Use your computer to access aaet.info, click on “examinations”, click on “written examinations”, to get info on the exam itself—cost, dates, etc. You can also go to the Professional Testing Corporation of New York website, click the “AAET” icon and download the study information booklet. The exam is given in two parts—a written and a practical. Passing both parts awards the tech a”R.NCS.T.” credential. It is a very thorough, detailed and fair exam. You can also get more information on the exam by contacting the examination committee at AAET through their website.

In the last two years, another exam for NCS has been established. The American Association of Neuromuscular and Electrodiagnostic Medicine (AANEM) offers another excellent exam. Go to AANEM.org. Click “ABEM”, click “Technologist” then click “CNCT Examination”, and finally click “CNCT Information Booklet”. Both written and practical parts are given and passing both awards the tech the “CNCT” credential.

In order to help the technologist further their education and also prepare for the exams, AANEM and AAET offer CMEs and CEs respectively. AANEM also offers a certification maintenance program as well. AAET offers mentors who are available to help technologists with any questions they might have.
Another essential medium to educate and prepare techs for the exams is through the wonderful textbooks available today. What a difference a couple of decades make! Today there are superb texts by MDs Preston and Shapiro, Dumitriu, Kimura, Lee and Delisa and Shin Oh (if you can find a copy…) and others just to name a few. Faye Chiou Tan also has a great little book called *EMG Secrets*. For the techs, Katey Hammer and Barbara Crout still have their fantastic books out there. There is also a new kid on the block, so to speak – Peggy Neal and Bashar Katirji from Cleveland have written *NCS Practical Guide and Diagnostic Protocols* which is a must-have book for your lab. In addition ASET has an excellent NCS Study Guide which Carrie Ford and others helped to spearhead and get written. The study guide and courses are available at the ASET website. The study guide is also an excellent way to identify your strengths and weaknesses in particular areas of NCS. Use it as help to concentrate and improve your weaker areas, while at the same time maintaining those areas that you feel comfortable with. ASET has an abundance of online courses, lectures, and webinars in all disciplines of electrodiagnostics.

As far as studying for written exams, I tend to narrow the number of texts to one, two, or three and then study them chapter by chapter, reading my weaker points—such as instrumentation and electricity and anomalies in my case—thoroughly over and over again. Group study is also very helpful if the occasion presents itself. Bouncing questions and scenarios off each other improves thinking and concentration skills, as well as having someone to be accountable to. For the practical exam, practice, practice, practice. Not only on patients, but on anyone and everyone you can bribe, coerce, or be indebted to. No one ever shows up on game day—exam day—and wins-passes—without putting in the work and time before the big day arrives.

In contrast to 30 years or so ago, we now have an abundance of information, texts and study guides to utilize in preparing for any exam, be it NCS, EEG, IONM, etc. One thing I’ve noticed though is that we still have an extraordinary number of technologists who are more than willing to share their knowledge and experience with others. The Internet, social media, blogs, message boards, chats, etc. have increased the availability and accessibility of these techs. To me, this is the backbone of ASET, AAET, AANEM, or any other organization that strongly promotes and encourages education and career advancement for their members without apology. Thank you for letting me be one of them…. USE ME….

**Neurodiagnostic Education**

*By Mary Feltman, R. EEG T., MEd*

My three helpful hints come from the classroom and what I have offered to my former students to do when studying for boards:

1. **Establish a schedule of studying and stick to it.**
2. **Partner with someone else who is studying to take boards.**
3. **Flashcards.**

- **Establish a schedule of studying and stick to it.** Delegate times that will work for you. In other words, if you select Tuesdays and Thursdays from 7 to 10 PM to be your studying/reading times, that is exactly the schedule. Stick to it. Being flexible and changing it whenever it doesn’t work, does not allow you to remain focused on your goal of passing the exam. Do not schedule … this week is Tuesday/Thursday, next week is Monday/Thursday, and the next week is Tuesday/Wednesday, because of bowling party, I am tired, or even worse I need to clean the house for tomorrow’s party. This is not being consistent. The reading you do on Tuesday should allow you to do a brief review on Thursday of that area you previously studied, that you might have had trouble
understanding. Plus, in between your study days, it allows you the time to take it back to work and seek some other people to help you understand it better.

- **Partner with someone else who is studying to take boards.** Hopefully there is a person in your area also studying for boards. If not, select someone who will be strict and critical with you and your learning agenda. By selecting a dedicated partner, this will help to keep you focused. You will also have a person to ask questions to and/or reason out your thought process. (This of course was a major positive addition for someone taking oral boards). A partner also keeps you committed, because you will feel that need to be focused because they are also depending on you and you do not want to let them down.

- **Flashcards.** A great majority of my students have demonstrated their best tool to learning…the flashcard system. Creating small cards with a word on one side and the definition on the flip side allows the individual to see the word, read the word or hear the word/answer and also have had to physically write or type it out. This just covered every type of learner…the visual, auditory and hands-on learning style. Don’t forget, these flashcards are little enough to go into a pocket or purse or book bag and always be with you when you have those free 10 to 15 minutes in the doctor’s waiting room.

Hopefully these three hints will help another tech to prepare and pass their board exams.

*By Mark Ryland, R. EP T., RPSGT, R.NCS.T., CNCT, AuD*

Obtaining a registry is much like going for a degree: in the end, it is more about perseverance and tenacity than anything else. The initial preparation is purely mental and spiritual—you have to boldly decide to do it, and then start praying!

But seriously, when I have my graduates prep for boards I do recommend using sample questions as I find them helpful. ASET has many sample questions for a variety of modalities, and the BRPT has numerous resources and sample questions. The thing about the sample questions is you get the feel for the type of questions, and the “style” in which the questions will be asked. This is helpful. Taking tests is a bit of an art form, and I have taken a few in my life! I actually did not obtain my NCS registry until 2007. And yes, I stressed and I did study for that exam: I studied a lot! I utilized the ASET sample questions as a guide to study. My advice is always the same. Get a sample test, a blank answer sheet and take the test “cold-turkey”, before you even begin to study. Go back and grade it, analyze your weak areas, and do your initial concentration of studying in those areas. After several weeks of study, retake the test, see if you have increased your knowledge and improved your score.

Mary Feltman covered some very good strategies for the actual study process, listen to her; she is correct!

In the end, it really is about will and desire. Most working techs or graduates of Neurodiagnostic programs have a good working knowledge of their modality. They probably know more than they realize, and will remember more than they thought possible (that is one of my mantras for my students). Loose the fear, pick up the books, utilize the many resources, and just do it!

**Neurofeedback**

*By Bill Coslett, CNIM, BCIA, EEG-C, PhD*

The topic for this article relates to preparing for certification as well as maintaining CEUs for re-certification. This is a timely subject as my CNIM recertification is coming up shortly.
I obtained my CNIM certification in 2004. To this day, I can still remember the acute anxiety I had in taking this exam. I was fortunate in the fact that my employer sent me to a workshop in certification preparedness. This gave me a basic understanding of areas that would most likely be covered in the exam. I went into the exam with a strong background in neurophysiology, but was relatively new to the field of intraoperative monitoring. I felt very comfortable in the monitoring skills that I used on a daily basis like SSEP and EMG. What produced my anxiety was those areas of monitoring that I did not do like ECoGs and EEG. It seems like most of my preparation was within these areas.

I prepared for the exam by reading articles, borrowing textbooks, and spending countless hours grilling those who had already passed the exam. My advice to those preparing for the exam is simple. Be prepared! Start with simple text like Goldberg’s *Clinical Neuroanatomy made Ridiculously Simple*. There is an abundance of excellent textbooks available. It is easy to become “bogged” down in advanced textbooks. There will be plenty of time to immerse yourself in these advanced textbooks. My second piece of advice is to those who do not pass the test the first time. Don’t sweat the small things. Use this as learning experience to build upon. I believe that statistics would back me on this fact that a large percentage of those re-taking the test will pass the second time.

It is important to realize that certification only ensures that the person possesses the minimal skills to be considered proficient in the field. It marks the beginning of professional development which is a lifelong process. Continuing education credits ensure that the individuals will continue to grow in the field by staying abreast of current developments in an ever-changing profession.

In 2004, there was a 10 year recertification period. For the first four years, I had literally forgotten about collecting CEUs. I first turned to *AJET* exams as a way of collecting free credits. Don’t overlook these exams. They are easy to collect and the price is right!!

My employer is very conscious about professional development. We have “Grand Round” presentations each month. There is also a “Journal Club” which is presented in a live meeting format on the internet which provides CEUs to those participating.

Attendance at the National Convention has the benefits of obtaining a large amount of CEU as well as an opportunity to network with other professionals in the field. When you attend these workshops, you get the opportunity to interact with leaders of the field as well as to connect with friends met over the years.

I have attended several regional workshops by ASET. Their “weekend courses” afford the opportunity to focus on specific topics and issues.

Use the many ASET tools that are available to you. Conference calls, webinars are just a few. The bottom line is to use the Society’s resources that are designed to help you keep up-to-date on changing thoughts and techniques in the field.

My advice for collecting CEUs is to begin immediately. Don’t procrastinate and wait until the last minute. Keep accurate records of attendance. This will not only help for recertification, but will also be useful for tax purposes.

The challenge I find in collecting CEUs is trying to maintain several certifications at the same time. I have to keep track of CEUs for neurofeedback as well as for intraoperative monitoring. Nurses are also in the same boat of having to collect dual CEUs. Deadlines are usually at different times. Trying to keep deadlines so that certifications do not lapse is not an easy task. Try to pick CEUs that could be used for both fields to minimize CEU costs.

Look at CEUs as a way of keeping abreast of topics within an ever changing field. Begin early, don’t procrastinate and keep meticulous records so that when it comes time to recertify, it can be done easily with little stress to you.
New Technologies and Research
By Andrew Ehrenberg, R. EEG T., CNIM, BS

Virtualization

This newsletter article on new technology and research will focus on an emerging technology in EEG called virtualization. While virtualization in the computer world isn’t really new, over the next few years you will see more of it in the context of EEG systems. First we will look at what exactly does virtualization mean. Second we will examine why it is becoming important in the EEG world and what it would look like. Lastly we will examine what additional concerns are important in virtualized EEG systems.

What is Virtualization?

Virtualization is one of the hot ‘buzzwords’ you may have heard recently. If you use an EMR, odds are you already have exposure to a virtualized environment. The term virtualization in our context is when a server with a lot of computer resources is used to create multiple instances of a simulated system. Specifically though, what does that mean? Let’s make it simpler.

Think of your desktop computer. It runs programs on the desktop. You could open the same program multiple times at once if you wanted to. Try it, you have the newsletter open now, in the program being used to view it. Leave it open and then open it again. You now have two ‘instances’ of the same program running at the same time, right? Now open it again, and again. Now you have four instances of the same program. Each instance of the program takes up computer resources, but your computer has enough power (I hope) to open the program multiple times.

Now, apply this same concept to a server that has a whole lot of resources. All of the programs a desktop computer runs, the operating system, and the programs it runs inside of it take up a certain amount of computer resources. A server can have many times the resources that an individual desktop computer has. Think of the server being able to run an instance of a computer as the same thing that you did when you ran multiple copies of the same program on your desktop computer. A server can run multiple instances of a whole computer system.

Why is virtualization important in the EEG world?

For many years, since EEG went digital, the model of an EEG system has been one amplifier that connects to one computer that runs the acquisition software. As network technology
has advanced, the model became an amplifier connected to a computer for acquisition, with a separate computer for running the reading software and a large data storage server for holding the EEG files, all of these connected over a network. With virtualized technology, the model will be multiple amplifiers connected over a network to a server that creates virtualized computers for acquisition, and that server also creating virtualized computers for reading. This virtualization server is most likely then connected over the network to a large storage system for EEG data files. Why is this important for EEG? One of the reasons is for departments with a lot of acquisition and reading systems, 20 to 30 computers can take up a lot of space. One configuration change that has been seen in recent years is for the acquisition PCs to be in a rack in a separate room. Even a floor to ceiling rack though only holds about eight to 10 systems at most. A virtualization server can host 10 to 20 systems or more, in a much smaller area. A floor to ceiling rack can hold many virtualization servers, each virtualization server hosting 10 to 20 systems.

As a quick note, I have heard estimates that one virtualization server could host 50 or so EEG systems, but I am not yet convinced of that. The reason being that normal virtualization servers like those used for EMRs are the basis for the estimates of how many computers sessions can be hosted. EEG, especially with quantitative EEG trends, or high channel intracranial monitoring recordings with high sampling rates take up a lot more computer resources than an EMR session. I might be wrong, but I would make a more conservative estimate of probably no more than 30 EEG systems (if that) per virtualization server.
What are some of the concerns that are important in virtualized EEG systems?

My golden rule in neurophysiology, and most things, is that it is vitally important to know both the strengths and weaknesses. There is no perfect EEG montage for example, each has strengths and weaknesses, but knowing the strengths and weaknesses of each allow us to put them to the best use. This is the same in this case of virtualized EEG. Some of the benefits are obvious; less computers to worry with, easy to expand the number of units you have (this is referred to as scalable), etc. There are, however, some significant factors that you need to be sure you have thought about.

First and foremost in my mind is that the hospital network becomes part of your medical instrument. Think about that for a second. When you are using your computer at work, to access the EMR, or check email, etc., you have probably experienced times where the network is slow to respond, or even times where the network at the hospital is down! This sometimes fickle network technology is now part of your EEG medical instrument. Medical systems using a hospital network are more and more common now days, and in actuality the FDA is working on specific standards and rules for hospital networks because of this (do an internet search for ‘FDA and hospital networks’ if you want to know more).

Second, in the virtualized EEG system model above, notice one thing, that there is a single point of failure. If your virtualized server goes down, all of your EEG systems are non-functional. This is a common concern in many virtualized situations, like EMRs. Usually to avoid this, backup servers are used, where in the event of a failure functions automatically transfer over to a separate, duplicate system (this is referred to as redundancy).

Third, a server that can host many virtualized computer sessions is expensive when compared to a desktop PC; a lot more expensive. What this really amounts to is that using a virtual server for one or two EEG systems will end up costing a lot more than desktop PCs. There is a breakeven point where the cost of the individual systems matches the cost of virtualized systems, but my gut feel is that this will be in the 10 to 20 EEG system range.

Lastly, a purely virtualized EEG system assumes that all locations where EEG will be done have the appropriate wiring/network capabilities. If an EEG needs to be done in another area, like the emergency room or operating room for example, that was not originally planned and so did not have the network capability needed, there would be no way to do the EEG. Portable EEG systems would still be needed to meet this demand, so there probably isn’t a way to feasibly do a full and virtualized only model.

**Pediatrics and Neonatology**  
*By Melanie Sewkarran, R. EEG T., CLTM*

Continuing Education – I absolutely believe that it’s a great and necessary part of any profession; I just wish I didn’t have to do it. Seriously, I am glad for the accountability. I honestly wouldn’t keep it up if I didn’t have to. Alas, I have to, so here are my thoughts...

My favorite (most used) method of gaining CEUs are the dreaded journal quizzes. If you have access the American Journal of Electroneurodiagnostic Technology (now The Neurodiagnostic Journal), there’s a ten question quiz at the back covering the content of the journal and if you complete it successfully you can earn two ACE credits. Sometimes I have to struggle through articles that don’t really apply to my specific clinical niche, but I remind myself that it’s good for me to be stretched and exposed to something new. Besides, the journal is published quarterly so if my math is correct and you submitted three of the four quizzes each year you’d have enough CEUs from quizzes alone to re-register. That sounds do-able, right? Maybe a little tedious, but worth it!

Another route for getting CEUs that we’ve used in our lab recently is the webinar (ASET offers them regularly). We are given a bit of an education budget, so when we hear of a webinar
One of the advantages of working at a larger hospital/educational institution is that lots of people around here need continuing education credits. It’s seems like there are always lectures or Grand Rounds or something that could expand our minds. You have to keep a close watch for topics that are relevant to neurodiagnostic, but every now and then something comes up (usually in the Neurology field) that could qualify. And for those of you that don’t work at a hospital but have one close by, it might be worth asking if they’d allow you to attend some of their talks.

And lastly, there are lots of credit possibilities at the regional Neurodiagnostic conferences. However, it can get pretty pricey if you don’t have a lab budget that will foot the bill. At the very least, try to wait for a conference that is close to home and then try to attend at least one day of talks. You’ll get to meet a lot of your neurodiagnostic colleagues, you’ll learn a ton, and even have a handful of CEUs to walk away with.

In the end, what we really need to learn from this is that continuing education is important. It keeps us from becoming stagnant in our field and ABRET’s requirements hold us accountable. Even if you’re not registered yet, look out – some of ABRET’s new “Pathways” for eligibility for the R. EEG T. exam include pre-test CEUs. So if you’re not motivated enough to do it simply for self improvement, do it because at some point, someone will require it of you.

Polysomnography/Sleep Technologies
By Kathy Johnson, R. EEG/EP T., RPSGT

The topic of registry exams and continuing education is a very interesting one in the field of sleep technology. There are currently three credentials for sleep technologists, each with their eligibility requirements, their own examination process and different continuing education requirements to maintain your credential. While my personal experience has been with the RPSGT credential, I will try to outline the basics of all three credentials for you here.

Board of Registered Polysomnographic Technologists (BRPT) is the most familiar and long-standing credential for sleep technologists. This group currently has two credentials for sleep technologists with different eligibility requirements. Please visit their website (www.brpt.org) for the details concerning eligibility. The Certified Polysomnographic Technician (CPSGT) credential is valid for three years and is not renewable. Certificate holders are required to earn 10 continuing education credits per year. Holders of the Registered Polysomnographic Technologist (RPSGT) credential must now recertify every five years. The date of recertification depends upon the original registration date and the first group began the recertification process in January 2011. Recertification requires documentation of fifty continuing education credits earned over the five year period and the BRPT provides an on-line tool for entering and tracking your credits. For both the RPSGT and the CPSGT credential, credits from approved providers will be accepted immediately while credits from other providers must be reviewed.

In 2008, the National Board for Respiratory Care (NBRC) launched a specialty examination for respiratory therapists performing sleep disorders testing and therapeutic intervention. The Sleep Disorders Specialist (SDS) credential is only available to registered respiratory therapists (RRT) or certified respiratory therapists (CRT). You can access their eligibility criteria at: http://www.nbrc.org/Examinations/SDS/tabid/92/Default.aspx. The requirement for continuing education for the RRT-SDS or CRT-SDS is 15 hours general respiratory care subjects and 15 hours sleep disorders testing and therapeutic intervention subjects.
The American Board of Sleep Medicine (ABSM) introduced a new credential for sleep technologists, the Registered Sleep Technologist (RST) in 2011. Technologists holding the RPSGT credential were able to obtain this credential without examination by paying a $25 fee. Eligibility information is available on their website at http://www.absm.org/techcertification.aspx. At the time of this writing, the requirements for continuing education have not yet been determined, however, it is my prediction the ABSM will follow the current policies for technologists working in AASM accredited labs, which are 10 credits per year (personal opinion).

So there is a synopsis of the credentials available for sleep techs……..but where can you get your required continuing education? Of course, as with all specialty credentials, there are always meetings and this is perhaps the easiest way to earn your credits, but also can be expensive. You will likely find that local or state meetings are less expensive but they may not offer the same variety of topics and speakers as found at national meetings. The BRPT will also accept credits earned with in-house in-services or lectures if they meet specific criteria. The NBRC will accept any course that is accepted by your state licensing board for purposes of respiratory care licensure. If your state licensing board has no requirements, the NBRC will accept any course approved by the AARC. Again, the ABSM has not published any guidelines for the continuing education requirement for the RST credential but this will certainly be forthcoming.

Technologists Working Alone
By Sunday Dale, R. EEG/EP T., CNIM, BAS

Our suggested “theme” for this newsletter is to share some advice, best resources, study tips, etc. for taking board exams. Since it has been a while since I have examined for The American Board of Registered Electroencephalographic and Evoked Potential Technologist, better known as ABRET, or taken a written or oral exam I went right to the ABRET website to find out what the changes to the exam process have been. Since 2006 you must maintain a number of continuing education credits within a 10 year period from the time of your registered credentialing in order for them to count towards recertification. There is a demo test online that can give you an idea of the features of the testing software.

It is important to be multi-task oriented in this age of technology because one credential is not enough to maintain a securely employed position. I have heard of EEG techs losing their jobs because they lack the skills to perform more than one procedure. Employers seem to be looking for individuals with a variety of skills and credentials to fill neurodiagnostic positions. Depending on the location of hospitals and clinics can also determine whether or not neurodiagnostics are even available. Quite often other departments such as Respiratory Therapy or Cardiac Care may perform the EEGs in small town facilities. Therefore experience or registration in other disciplines may be necessary.

I would suggest that anyone preparing for an exam pace themselves with a reasonable time frame for studying and reviewing at least six months prior to the exam date. This six months time frame can be subject to change depending on how you feel your study process is going. Once you receive the “Handbook for Candidates”, through ABRET, for the specific exam you want to take, read through it carefully and mark your calendar for your target exam date. Acquire as much as possible the recommended references for your reading. Break the outline provided in the Handbook down into sections and begin studying. Having a study partner is a good idea. Because of the expansion and addition of new words and terminologies to the field an up-to-date medical dictionary can be invaluable. ASET is also your best asset when it comes to study materials and conferences.

Studying and preparing for an exam of any type can be a very awesome experience. It requires determination, focus, dedication and an unlimited amount of desire to be the best in your
chosen field. ASET and ABRET are dedicated to helping you achieve your life time goals. So if you are in the process of or thinking about taking credentialing exams I want to wish you the best of luck and much success in your studying.

MEMBERSHIP NEWS AND UPDATES

Call for Recommendations for Theda Sannit Outstanding Educator Award

This award was established to recognize an outstanding educator in the field of neurodiagnostics. The educator may be a technologist or physician. To recommend a candidate for nomination, please send the name of the person with a brief note stating the reason for your recommendation to Jie Zhang, ASET Award Committee Chair, at zhanj@musc.edu. For information on the award, eligibility requirements and to view a list of previous award recipients, click here. The deadline for submitting recommendations is May 15, 2012.

Nominations for Distinguished Service Award Now Open

Do you know an ASET member who has actively participated at the local and national levels, demonstrated success in the field of neurodiagnostics, or is an outstanding ambassador for the neurodiagnostic profession? If so, please nominate him or her for ASET’s Distinguished Service Award. For information on the award guidelines and to access the nomination form, click here. Deadline for award nominations is May 15, 2012.

NEW ONLINE COURSES NOW AVAILABLE

LTM 105: Instrumentation in LTM
By: Dan Sweeney, R. EEG/EP T., CNIM, CLTM
Guest presentations by: Jay Gunkelman, BS, CMET, and Mark Scheuer, MD

Course Goals
This course will instruct the learner in the fundamentals of electrode function and connection methods, instrument amplifier components and functions, digital video and audio functionality, computer networking and data storage basics, LTM review equipment functionality, power support and equipment life cycle management. Also discussed will be QEEG basics and advanced topics, and QEEG measures in the ICU. Successful completion awards 20 ACE credits.

For a detailed list of the Learning Objectives, click here.

LTM 109 Board Preparation and Practice Exam for LTM Technologists

This course is intended to help the learner prepare to take the LTM credentialing exam. The questions and review materials included in this course will help guide the learner in the appropriate areas of study, and the questions in this review fall under the general topic outline of subjects

$199 ASET Member
$299 Non-member

$89 ASET Member
$179 Non-member
covered in the credentialing exam. The course begins a one-year timer when the purchaser first logs on. The practice exam can be taken over and over and contains over 500 questions in a database. No ACE credits awarded.

**NCS 104 Technical Aspects of Upper & Lower Extremity Nerve Conduction Studies**
*by: Meledy Kise, R.NCS.T., CNCT*

**Course Goals**
Develop skills to perform basic upper and lower extremity NCS studies with an understanding of the basic anatomy and neurophysiology, instrument settings, measurement techniques, electrode placements, muscles and nerves involved in the testing and testing procedures. Successful completion awards 10 ACE credits.

For a detailed list of the Learning Objectives, [click here.](#)

**Reading Assignments (required text):**
“Electromyography and Neuromuscular Disorders” by Preston and Shapiro

**NCS 112 Study Guide, Board Prep Reviews and Practice Exam**

This set of over 300 NCS practice exam questions along with handout materials for study is designed to help prepare the neurodiagnostic technologist to add nerve conduction studies to their technical skills and prepare them for taking the board exam in NCS. The purchaser is allowed one year access to the practice exam and study guide materials. The practice exam can be taken multiple times. No ACE Credits.

**Two Day Extended Webinar:**
**ICU cEEG Monitoring: An Introduction for LTM Technologists and ICU Nurses**

Mark your calendars for this two-day event! **Groups can participate live for one registration fee** and the recordings will be available later in the online education portal. If your hospital has purchased the recordings, which also come with participation in the live webinar, you can take the quiz for a $20 fee.

The webinar will begin at 9:00 am Central time each day. The target audience for this two-day event will be those technologists newly expanding their skills to include continuous EEG monitoring in ICU using cEEG, and also nurses with interest in expanding their knowledge of cEEG and its uses in ICU.

Monitoring patients continually in the ICU requires a team approach and this webinar is for all members of the team who are participating or plan to participate in the expanding field of cEEG in the ICU.

ACE credits will be available for technologists and ASET is applying for CEUs from the American Association of Neuroscience Nurses (AANN).
### Schedule of Events - Day 1
#### Thursday, May 10

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Presenter</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00 a.m.</td>
<td>Electrode Location, Re-application and Maintenance</td>
<td>Marti Sherrill, R. EEG/EP T., CNIM, CLTM</td>
</tr>
<tr>
<td>10:15 a.m.</td>
<td>Basic Patterns and Patterns Common in the ICU (pedi &amp; adult, wake-sleep)</td>
<td>Cheryl Plummer, R. EEG T., CLTM</td>
</tr>
<tr>
<td>11:30 a.m.</td>
<td>Artifact Recognition in the ICU</td>
<td>Anne Van Cott, MD, FAAN</td>
</tr>
<tr>
<td>12:45 p.m.</td>
<td>Seizures &amp; Neurologic Signs Seen in ICU (both convulsive, and non-convulsive seizures, myoclonic seizures, myoclonus, decorticate and decerebrate posturing, etc.)</td>
<td>Sarah Schmitt, MD</td>
</tr>
<tr>
<td>2:00 p.m.</td>
<td>Communication, Reporting Events and Documentation of Meds, Vitals, etc.</td>
<td>MeChelle Vance, R. EEG/EP T., CNIM, CLTM</td>
</tr>
</tbody>
</table>

### Schedule of Events - Day 2
#### Friday, May 11

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Presenter</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00 a.m.</td>
<td>Continuous EEG Monitoring Rational &amp; Clinical Correlations</td>
<td>Bradley Kolls, MD, PhD, MMCI</td>
</tr>
<tr>
<td>10:15 a.m.</td>
<td>Diseases, Traumatic Brain Injury &amp; Encephalopathy</td>
<td>Lawrence Hirsch, MD</td>
</tr>
<tr>
<td>11:30 a.m.</td>
<td>Neurotelemetry Applications for Hypothermia Protocol</td>
<td>Ryan Lau, MS, R. EEG/EP T., CNIM, CLTM</td>
</tr>
<tr>
<td>12:45 p.m.</td>
<td>Case Presentations in cEEG ICU Monitoring</td>
<td>Lawrence Hirsch, MD</td>
</tr>
<tr>
<td>2:00 p.m.</td>
<td>Trending EEG in the ICU</td>
<td>Mike Guess, BSAT, CBET, VP Persyst Development</td>
</tr>
</tbody>
</table>

*Application for 10 credits CEU approval pending with AANN.
For more info visit, [www.asct.org](http://www.asct.org), to register, [click here](http://www.asct.org).*

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**CONGRATULATIONS TO OUR NEW MEMBERS [since 01.04.12]**

**Institutional Members**

Carolinias Medical Center - NorthEast
Williams S Middleton Memorial VA

**Individual Members**

- Sahar Abdelrehim
- Anwar Abo
- Jonathan Adams, CNIM, BS
- Cindy Akkerman, MBA
- Susan Al Nabhani, ECNE
- Gerald Allen, BA
- Abeer Alshaikh, R. EEG/EP T.
- Ibrahim Amer
- Jessica Aponte

- Christopher Arna
- Christa Armstrong, BS
- Melissa Armstrong, AS
- Bethanne Arnold, AAS
- Keith Arrants, R. EEG T., RPSGT, AS
- Lauren Asermely, BA
- Jill Austin
- Kimberly Bark
- Karyn Bennett, BS
ASET 2012 Annual Conference
Trailblazing Neuropathways

New 3-day Conference Format
Make plans now to join us in Saint Paul, MN for ASET’s 53rd Annual Conference. ASET has been trailblazing pathways in neurodiagnostics since 1959. Last year’s conference was one of the largest events we’ve had in recent years; help us beat that mark by attending this year in Saint Paul. In an effort to meet your requests and make this national conference easier for busy technologists to attend the entire event, we have shortened the schedule to three days. Each day is packed with valuable presentations that will make a difference in your work-life. The Keynote address and Special Lectures are spread out over the three days, and the course tracks and abstract presentations will run concurrently, allowing maximum flexibility and customized learning. To view the daily schedule, click here. The special lectures listed below will be offered as a plenary session so you may participate in the course tracks of your choice as well as listen to our extremely talented invited lecturers.

If you have not visited St. Paul, you are in for a treat! This is a vibrant, sophisticated city, with affordable downtown restaurants, shops and entertainment that is an easy walk from the conference hotel. The location of the Crowne Plaza Riverfront is ideal, right on the banks of the Mississippi River, where a Riverboat Cruise awaits us on the evening of Saturday, August 4th.

St. Paul, MN is a welcoming city with lots of activities for the whole family. When the meeting is not in session, take in the sites of the twin cities. Visit the Mall of America and ride “Brain Surge”, a new rollercoaster as part of Nickelodeon Universe. Catch a Minnesota Twins baseball game in the evening and join us on the ASET chartered riverboat dinner cruise as well.

Saint Paul is accessible by air from anywhere in the U.S. in less than four hours and is Minnesota's capital city located on the banks of the iconic Mississippi River. Brian Williams, NBC Nightly News Anchor, made the following statement while broadcasting live from Minnesota during the 2008 Republican National Convention, "If you don't like Saint Paul, you've got a screw loose."

Join us August 2 – 4, 2012 in Saint Paul, MN at the Crowne Plaza St. Paul Riverfront hotel for a memorable and educational event not to be missed!
SPECIAL LECTURES

Thursday, August 3
8:15 - 9:30 a.m.

Lewis Kull Memorial Keynote Address
“A Moment in Time”

*Brien J. Smith, MD, FAAN*

Abstract
The role of neurodiagnostic technologists is essential in the effort to provide a diagnosis and monitor the treatment of patients with epilepsy and many other neurological diseases and injuries. We literally capture many “Moments in Time” of our patients, as we record EEGs, capture seizures on LTM and monitor brain and nerve function during surgery. In his Keynote Address, Dr. Brien Smith will tell fascinating stories using case studies to illustrate the impact of our work on patient outcome and how much the information we provide helps the medical team provide the best possible care. Many times, we are the caregivers present when our patients experience seizures and symptoms that are very emotional “moments in time” for them.

*The Keynote Address is sponsored in perpetuity by ABRET, in memory of Lewis Kull.*

For a biographical sketch of Dr. Smith, [click here](#).

Friday, August 3
8:00 - 9:15 a.m.

Ellen Grass Lecture
“Extraordinary Biorhythms”

*William O. Tatum IV, D.O., F.A.A.N, F.A.C.N.*

Abstract
Cerebral sources of EEG potentials expressed by the brain have been recorded on the surface of the scalp for years and appear between 1-35 Hz. When analogue EEG was performed, artifact was a problem that was present in many of the recordings and the growth of EEG stilled. With the advances in digital technology, present day EEG has expanded to include various intracranial recording techniques and multi-channel systems to permitting access and to regions of the brain that have previously been off limits to conventional EEG recording. The future will include extraordinary biorhythms where frequencies beyond the routine bandwidths disclose networks of epileptogenic regions involved in generating seizures. The use of micro-EEG recordings will expand our understanding of epilepsy from the very cellular level. The spectral frequencies from infraslow activity to high frequency oscillations will carry implications for those with uncontrolled seizures. Beyond the normal spectra that are typically analyzed, extraordinary EEG
will provide a window into revealing the epileptogenic zone in addition to furthering our understanding of the processes of the brain itself.

For a biographical sketch of Dr. Tatum, click here.

**Saturday, August 4**
**8:00 - 9:00 a.m.**

_**Kathleen Mears Memorial Lecture**_
_“An Update on Patient Safety Issues in the Epilepsy Monitoring Unit”_

**Janice M. Buelow, PhD, MS, BSN**

**Abstract**

Patients with epilepsy are at increased risk for injury by the very nature of their disorder. In everyday activities they are at a higher risk than people without epilepsy. When patients are admitted to epilepsy monitoring units or to EEG facilities, the purpose is to gather information regarding their seizures and their seizure disorder and often times seizure provocation techniques are utilized to encourage seizures. Because of the potential risk for injury when encouraging seizures, it is critical to understand and be aware of the specific risk and to have a plan to prevent injury during any type of monitoring. The American Epilepsy Society (AES) conducted a Delphi study to identify consensus on the activities necessary to address patient safety while they are being monitored. A review of general information regarding the culture of safety and the risk that patients with epilepsy face when being monitored will be presented followed by a thorough discussion of the AES recommendations for patient management during monitoring. Currently the AES is developing an interactive educational program to address patient safety issues and examples of this program will be shown.

For a biographical sketch of Dr. Buelow, click here.

**NETWORKING & SPECIAL EVENTS**

**ASET Chartered Riverboat Dinner Cruise**
**Saturday, August 4**
**7:00 - 9:00 p.m. (Boarding from 6:30 - 7 p.m.)**

After an intense three days of learning, what better way to wind down your experience at the Annual Conference than on a riverboat cruise? Just imagine cruising the mighty Mississippi River on a paddle boat while taking in the beautiful scenery, gentle breeze and watching the sun set across the Minnesota sky.

ASET has arranged for a private charter dinner cruise for conference attendees aboard the Anson Northrup for Saturday evening, August 4. Boarding is from 6:30 p.m. to 7 p.m. at Harriet Island, less than a 10-minute walk from the Crowne Plaza. The boat departs at 7 p.m. During the two-hour cruise, enjoy a fabulous dinner, cash bar and live entertainment by ASET’s very own member band, the Dendrites.
Tickets for the dinner cruise are only $30. To purchase, check the ASET Chartered Dinner Cruise box under Additional Conference Options of the conference registration form. Only 224 tickets can be sold so order early. **Tickets must be purchased before Friday, July 27, and will not be available for purchase onsite at the conference.**

**Exhibit Hall Welcome Reception**  
**Thursday, August 2**  
**6:00 – 7:30 p.m.**

This reception offers attendees an opportunity to meet new friends, renew old acquaintances, and explore the exhibit hall in a relaxed and casual atmosphere. Leading companies providing services, equipment, and supplies to the Neurodiagnostic profession will be on hand to answer your questions, and show you what's new in the industry! Light hors d’oeuvres will be served and a cash bar will be available. The Exhibit Hall Reception is included with a Full 3-day registration, and Guest Passes.

**ASET Annual Business Meeting and Awards Luncheon**  
**Friday, August 3**  
**12:15 – 2:00 p.m.**

The Annual Business Meeting & Awards Luncheon is an important event not to be missed. This is your opportunity to hear about the state of affairs of ASET and bring up any new business before the Society. Hear the annual reports of the ASET President, Secretary-Treasurer, and ASET Foundation Chair, and witness the installation of the newly elected trustees to the ASET board. The awards portion of the program will include presentations of the prestigious Maureen Berkeley Memorial Award, Theda Sannit Outstanding Educator Award, Distinguished Service Awards and the inductees into the first class of Fellows. All conferees are invited to attend and is included in the conference registration fee, but only Active, Associate, Student, Lifetime and designated voting representatives of Institutional members in good standing of the Society attending the meeting will constitute the voting body.

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The Scott Community College END Technology students raise money each year to further their education through conferences/meetings in the area/region of the Midwest. The funds allow them to attend conferences/meetings such as Iowa Society meeting/Illinois Society meeting/CSET/ASET/etc. This year the students are selling T-Shirts for $15 to raise money to attend ASET’s Annual Conference in Saint Paul, MN. If interested, or to see a picture of the shirt, please email Anna Beck at abeck@eicc.edu (please make checks payable to SCC END Club); there will be a $2.50 shipping charge per shirt.

**The students at Scott Community College thank you!**

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ASET FOUNDATION NEWS

ASET Foundation Announces Scholarship Opportunities for 2012 ASET Annual Conference

ASET Scholarships are available for Society members to attend the 2012 ASET Annual Conference, August 2-4, in St. Paul, MN. It is the goal of the Foundation Board to annually fund four full registrations to the conference. ASET Scholarships may be applied only to registration costs. The scholarships cannot be used to defray cost of travel to attend the education event. Scholarships are awarded based on financial and educational needs of the applicants. Additional evaluation criteria of applications include – but are not limited to – educational growth for personal and/or professional application, the need for skills as defined by lab expansion or change in employment, an employment promotion with the need for continuing education, and preparation for board exams. The deadline for filing ASET Scholarship applications for the 2012 Annual Conference is May 1, 2012. To download the ASET Scholarship application form, click here.

Thanks to the generosity and support of Cadwell Laboratories, Inc., Elizabeth Mullikin Consultant, Lifelines Neurodiagnostic Systems, Inc., Nihon Kohden America, Synapse Neuromonitoring, and Weaver and Company, new Company Sponsored Scholarships (CSS) also are now available to the 2012 ASET Annual Conference. For more information on the scholarship opportunities and to download the application form, click here. There is no limit on the number of CSS scholarships you may apply for as long as you meet the eligibility requirement(s). The deadline for filing CSS scholarship applications to the ASET Annual Conference is May 1, 2012.

ASET Foundation Silent Auction Returns for 2012 ASET Annual Conference

For all of you who missed not having the Foundation’s Silent Action at last year’s ASET Annual Conference in Atlanta, GA, we are pleased to report that preparations are now underway for the Silent Auction to be held at the ASET 2012 Annual Conference, August 2-4, in St. Paul, MN. Items for the silent auction will be on display in the annual conference exhibit hall. Bidding will open at the Exhibit Hall Opening on Thursday morning and continue during all exhibit hall hours. The silent auction will be closed-out – and funds collected – during the final 20-minutes of the Friday morning coffee break in the exhibit hall.

The Foundation’s silent auction is its largest annual fundraising event. Now more than ever we need your help and generosity to make this event successful. Please consider donating one or more items for the auction. Past popular items have included electronics (iPods, digital cameras, pocket camcorders, wireless reading devices, car navigation systems), jewelry, and gift baskets. To make a donation, simply complete the donation form and return to the Foundation no later than July 1, 2012.

The ASET Foundation supports educational initiatives, programs, and special projects designed to advance and support excellence in quality patient care by providing resources to neurodiagnostic students and professionals to enhance knowledge, understanding, and skills in the field. All donations to the Foundation’s silent auction, and all contributions, are tax deductible from your income in the year they are donated. Emphasis from all proceeds from the silent auction will be placed on the ASET Scholarship Fund, Curriculum Development Fund, and general operating costs, followed by supplemental funding of the Foundation’s named funds.
ASET Foundation Offers Tuition Grant Assistance

The ASET Foundation offers tuition grants to assist and encourage qualified students to further or continue their interest in selecting the allied health field of neurodiagnostic technology as a new or continued career. Any student who will be or is currently enrolled full-time in a CAAHEP accredited neurodiagnostic program is eligible to apply for a tuition grant. In addition, persons who are already employed in the neurodiagnostic profession may also apply for a grant to attend a 2-year junior college or a 4-year college to pursue their degree.

The number of tuition grants and the dollar amount for each is determined annually by the ASET Foundation Board of Directors. Typically, tuition grants range in value from $500 to $1,000.

Applications for tuition grants must be completed and returned to the Foundation no later than July 1, 2012 for the coming school year. Copies of the applicant’s academic transcripts (if applicable) and all letters of recommendation and references also must be received by the Foundation by July 1st. For more information on the Foundation’s tuition grant program and to download an application form, click here.

Applications for John Knott Educational Lecture Now Being Accepted

Originally conceived by Albert Grass and John Knott, the John Knott Educational Lecture program is a lecture series designed to bring distinguished speakers to an area society meeting, thereby providing exceptional educational opportunities for technologists who might be unable to attend the national meetings. Local, state, and regional societies representing the interests of neurodiagnostic technologists are eligible for the opportunity to host a Knott Lecturer.

To be considered to host a Knott Lecturer, the society must complete the Request for Lecturer form. Local, state and small regional societies will receive consideration over the large regional groups who can better attract experienced speakers. Selection also will be based on the order in which applications are received; how recently the society has hosted a Knott Lecturer; and the information presented in the Request for Lecturer application.

The John Knott Educational Lecturer program is supported by interest earned on a restricted fund as well as by member contributions to the fund. The ASET Foundation is responsible for the fund management and annual selection of the host society. The ASET Foundation covers the costs of hotel, travel, and meal expenses incurred by the lecturer, duplication of handout materials, and a lecturer honorarium.

Applications are now being accepted for societies to request a speaker for meetings held from September 2012 through August 2013. The deadline for applications is July 1, 2012. As instructed on the Request for Lecturer form, please send completed applications to Faye Mc Nall, ASET Director of Education.

The ASET Foundation gratefully acknowledges the following individuals who have made a general or named donation to the Foundation since 01/04/2012. Thank you for your continued support!

Judy Ahn-Ewing
Jose Arvizu

Steven Bailey
Michael Bechel
Marc Beezy
Sally Bennett
Michele Bergbauer
James Bowen
Lori Ann Brinkman
Michele Carley
Joel Clipperton
Jack Connolly
Dennis Dlugos, MD
Jean Farley
Cynthia Fialho
Tae Fugate
Constance Gilbert
Roy Gilbert
Ignacio Gonzalez
Leo Happel
John Hardy
Michelle Hollester
Lola G. Ibarra
Major S.M. Izac
David Juras
Debra Lagaly
Renee Mailberger
Molly McCormick
Carroll McGorkey
L. Elizabeth Mullikin,
   In Memory of Martin Mullikin
Sandra Penney
Cheryl Plummer
Giselle Rackley
Jayant Rana
April Robertson-Thompson
Julie Rocksvold
Peter Seaba
Loreen Senior
Linda Strock
Karen Thomas
Mary Ellen Wells
Maxine Wilson-Young
Jeanne Yoshina
Cadwell Laboratories Inc.
Lifelines Neurodiagnostic Systems
Nihon Kohden America
Presidents Circle
In honor of Rainbow Babies and Childrens PMU

IMPORTANT DEADLINES AND OPPORTUNITIES

APRIL
- April 15-21, 2012 – Neurodiagnostic Week

MAY
- May 1, 2012 – Deadline for filing all Scholarship Applications for the 2012 Annual Conference
- May 10 – 11 – Two-Day Extended Webinar: ICU eEEG Monitoring: An Introduction for LTM Technologists and ICU Nurses
- May 15, 2012 – Theda Sannit Outstanding Educator Award Nominations Deadline
- May 15, 2012 – Distinguished Service Award Nominations Deadline
- May 28, 2012 – Memorial Day, ASET Offices Closed

JULY
- July 1, 2012 – Deadline to submit John Knott Educational Lecturer Application
- July 1, 2012 – ASET Foundation Tuition Grant Application Deadline
- July 1, 2012 – Deadline to submit Silent Auction Donation Form
- July 4, 2012 – Independence Day, ASET Offices Closed
- July 25, 2012 – ASET Fall Education Seminars Scholarship Deadline

LINKS OF INTEREST
- Neurodiagnostic News Flash: Sharing our Neurodiagnostic Heritage with the World
- ASET Online Education
- Faye’s Department of Education Blog
- Credentialing Organizations
- Employment Exchange/Career Center
- ASET Staff: Special Services
- ASET on Facebook
- ASET on Twitter
Announcement Policy – The appearance of meeting, course and workshop announcements in this newsletter does not constitute endorsement or approval by ASET of the content or quality of the program. Announcements are accepted subject to publisher’s approval, must be relevant and may be altered for clarity, style and length. Most events are paid advertising.