

# NEUROSURGERY



From the Desk of Edward Benzel, MD  
Chairman, Department of Neurosurgery

The emergence of spring in Cleveland is a welcome transformation from cold to warm, from white to green, from the midst of the final year of training for our chiefs to the slide into the home plate of graduation. As Ryan Brennan, Andrew Torre-Healy, and Saksith Smithason complete their slide to home we remain in awe at their composure and collective maturity, strength, wisdom and clinical skills. They have weathered significant 'storms,' obstacles and clinical and administrative challenges. They have remained unflappable while leading, teaching, mentoring, and - oh by the way - learning. I could not be more proud of this triumvirate, as they finish, leaving their indelible mark on Cleveland Clinic Neurosurgery.

It is only fitting that our Chiefs have chosen a Cleveland Clinic Neurosurgery icon of years gone by, Moses Taghioff, as the Gardner Lecturer. Dr. Taghioff, in many ways, embodies what our chiefs have demonstrated as they have emerged as leaders in the highest sense of the word.

We all look forward to graduation day, perhaps no one more than the Chiefs and their families. The Chiefs finally 'finish the grind' and we all become more familiar with at least one man who helped our Neurosurgery program get to where it is today.



Ryan Brennan, MD



Andrew Torre-Healy, MD



Saksith Smithason, MD

## Cleveland Clinic Neurosurgery Alumni Connection

SPRING 2016

upcoming events

*The Department of Neurosurgery proudly presents:*

### Resident Graduation Ceremony

Saturday, June 11, 2016

6:00pm Reception

7:00pm Dinner

Ritz-Carlton

1515 West Third Street, Cleveland, OH 44113

### Gardner Lecturer



Moses Taghioff MD, FACS, FAANS

(CCF Neurosurgery Alumni 1973)

Neurological Surgery

Medical Director, Perioperative/Strategic Surgical Services

Washington Hospital Healthcare System, Fremont, CA

Dr. Taghioff was born in India where he obtained his early education and medical degree. He traveled to America in 1967 to complete a one-year internship at St. Vincent Charity Hospital in Cleveland, Ohio. Dr. Taghioff completed his general surgery residency year at Albert Einstein Medical Center in Philadelphia, Pennsylvania, followed by a four-year neurological surgery residency at Cleveland Clinic, commencing on June 30, 1973. From 1973 until his retirement in 2006, he was in practice at Washington Hospital in Fremont, California. Retirement did not last long...currently Dr. Taghioff is the Medical Director of Perioperative and Strategic Surgical Services at Washington Hospital Healthcare System. He resides in California with his wife, Nafisa, and has two, successful, adult children, Michelle and David.

## Alumni Spotlight



**Dani S. Bidros, MD, FACS**

(CCF Neurosurgery Alumni 2011)

Lafayette Brain & Spine

Lafayette, Louisiana

Specific events in life, happen for a reason. When life struggles occur, some people shy away from the challenge, others accept the challenge and decide they will try to rise to the top. I always thought the biggest challenge in my life would be moving across the world to a new country without knowing English, and trying to create a new life and opportunity for my family. I would later realize that my dream of becoming a Neurosurgeon was as big of a challenge.

My family and I moved to the United States in 1988. I was nine years old. Being the youngest of three, I had two older siblings to look up to. My parents sacrificed their way of life in their home country to provide us with what many people outside the United States dream of, an opportunity to live 'The American Dream.' My family moved us to Lafayette, Louisiana. This small town in southern Louisiana is the home my relatives chose to settle in back in the 1970's. My uncle left Syria to study abroad, and while in Italy studying Art and Architecture, he met a lady who was from Louisiana. They were married and he got a job teaching at the University in Lafayette, LA. More of our relatives followed, and we were the last of our family to make the move. I began sixth grade without knowing English. I knew I needed to learn English quickly, or I would continue to get myself in trouble with my teachers for saying inappropriate things that the other kids would tell me to say. It took me the first year in school to get acclimated to the new community, and from there I was able to progress. After graduating from Lafayette High School, I attended the University of Louisiana at Lafayette. My experience in college was great, and studying Biology/Pre-Med was familiar as my older brother, Rafi, had done the same. College prepared me well for medical school at Louisiana State University in New Orleans. Medical School was certainly the best four years of my educational career. Living in New Orleans and making lifelong friends in medical school was instrumental in my growth as a person. I was lucky to have an older brother who was able to pave the way for me. At that time, he was starting his general surgery residency, which ultimately led him to become a successful plastic surgeon in Houston, Texas. As medical school progressed my interest was drawn towards a surgical specialty, and after my rotation in neurosurgery I knew I found my calling in life. The neurosurgery residents were always in the hospital, working long hours, dedicated, and smart. Neurosurgery at Louisiana State University in New Orleans

was a one resident per year program. It was a challenge to become the one resident accepted. I remember the day I received the phone call from my then chairman, Dr. David Kline, welcoming me into the program. Dr. Kline is a world famous neurosurgeon who pioneered peripheral nerve surgery. Stories of Dr. Kline at Charity Hospital were legendary. To me, Dr. Kline was a father figure. He was the one who would take a chance on me, to be one of his residents. My first year of residency was a general surgery year where I enjoyed spending time with the various surgical subspecialties, under the Chief Resident, my brother. I always knew my brother was smart, but I had no idea how talented he was in surgery until working with him. I gained a new respect for what it takes to be a great surgeon. After completion of my intern year, I started my first year of the Neurosurgery Residency Program in July 2005. I was nervous, as any new resident would be—fear of the unknown and the new responsibility of patient care. I had no idea that those fears would pale in comparison to the emotions I would feel following the biggest storm to ever hit the United States in late August 2005. Warnings were out that there was a hurricane heading into the Gulf of Mexico, but having lived in New Orleans for so long, I didn't get too worried just because of the weather. I would soon realize that the experience in the week to follow would be one I would remember for the rest of my life. Many people—even those not in the medical profession—have heard of the term 'Code Blue.' New Orleans' Charity Hospital utilizes the term 'Code Grey' when there is a bad storm ahead and only a skeleton crew of essential personnel remains in the hospital. If you are on call the day that the 'Code Grey' is called, you make up part of the skeleton crew. Otherwise, you are free to evacuate. Being only one of two neurosurgery residents at Charity Hospital, I would stay in the hospital along with my chief resident and our chairman.

My week stay at Charity Hospital during Hurricane Katrina was a test of human struggle, fear, survival, courage, and camaraderie. You could hear the breaking of windows from around the hospital and every now and again, the thunderous crash of a window air-conditioning unit falling from the upper floors down to the ground. As the windows continued to break, the patients became more nervous, as they were right next to the windows. We moved all of the patients in their beds into the halls. This took quite a bit of maneuvering, with many patients being in traction, on oxygen, connected to tubing and monitors. They remained in the hallway for the remainder of Hurricane Katrina. Ventilated patients had to be "bagged" for hours on end. Food and water were in short supply. We took care of the patients as well as we could, and wondered when they were going to be evacuated.

The evacuation of patients did not happen for six days. People from the Department of Wildlife and Fisheries were going up and down the street in air boats, organizing evacuations. Being one of the last people to walk out of Charity Hospital, I knew things were never going to be the same. I was lucky to have some place to go. I stayed with my family in Baton Rouge and Lafayette for the first few weeks after the storm. I watched the news here and there, but couldn't quite digest what had happened while I was in the hospital. After a couple of weeks had passed, it was time to get back to work. Unfortunately, all of the residents ahead of me had left to other training programs. Knowing that my training at Charity Hospital had ended, sadly I would have to leave.

I had an opportunity to move to Cleveland, Ohio, and continue my neurosurgery training at the Cleveland Clinic. I never could have imagined a better place to train as a neurosurgeon. Dr. Ed Benzel, Chairman of the Neurosurgery Program at the Cleveland Clinic, was very instrumental in my success as a neurosurgeon. He is a great leader, teacher, and surgeon. During my residency, I learned from the very best in the field, and treated the most complex of neurological diseases. The training at the Cleveland Clinic provided me with the skills to treat any neurosurgical patient that I would encounter in my career. My patients were an integral part of my training, as I learned some of the most important lessons from them. Often, we see patients who are diagnosed with malignant brain tumors; no matter how little time they had left, they did their best to live life to the fullest. You could see how they realized the most important things in life, family.

I have lived in many different cities, but Cleveland holds a special place in my heart. Cleveland is where I would meet my wife, Maria. We were blessed with two boys, Daniel (now 7) and Jacob (now 5) while living in Cleveland.

My wife and I were very sad to leave the place we called home but a job opportunity took our family to Princeton, New Jersey. While in New Jersey, we had our third boy, Samuel (now 3). After a two year stop in New Jersey I had the opportunity to return home to practice neurosurgery. It was always my intention to return to my hometown of Lafayette, Louisiana, to practice. Starting my own practice was the best decision I could have made. It has allowed me the freedom of taking care of patients in the manner I feel is best.

Neurosurgery is not only my profession, it is my passion. When you do what you love, the seemingly impossible becomes simply a challenge; and when faced with a challenge, look for a way, not a way out.



Images from New Orleans and Charity Hospital during Hurricane Katrina



Bidros Family

## Alumni Updates



**Andre Machado, MD, PhD**  
(CCF Neurosurgery Alumni 2006)  
Chairman, Neurological Institute

Dr. Machado is the newly appointed Chairman of the Neurological Institute and the Charles and Christine Carroll Family Endowed Chair in Functional Neurosurgery. His clinical areas of interest deep brain stimulation (DBS) surgery for patients with Parkinson's disease, tremor, dystonia and obsessive-compulsive disorder as well as surgical procedures for patients with trigeminal neuralgia, intractable pain syndromes and spasticity.

Dr. Andre Machado received his medical degree from the University of Sao Paulo in 1997. He completed his residency in the same institution in 2003 and obtained his Ph.D. in

2004. He came to the Cleveland Clinic in 2004, completed his fellowship in Stereotactic and Functional Neurosurgery in 2006 and has been on the staff of the Cleveland Clinic since then.

Dr. Machado leads several deep brain stimulation and neuromodulation clinical trials as well as laboratory research. His research in deep brain stimulation for thalamic pain syndrome was awarded the National Institutes of Health Director's New Innovator's Award. In addition, he conducts deep brain stimulation research for treatment refractory depression as well as obsessive compulsive disorder. His laboratory in the Lerner Research Institute is focused in developing new strategies for utilizing neuroprosthetic devices such as DBS to improve post-stroke rehabilitation. His current NIH funded research is aimed at evaluating the effects of deep cerebellar stimulation on post-stroke perilesional plasticity and recovery of function.

Dr. Machado is conducting a series of town hall and department meetings to discuss staff engagement and directions for the NI. Please make sure to join.

## Neurosurgery Updates

### Deep Brain Stimulation for Post Stroke Rehabilitation | Andre Machado, MD, PhD

Despite significant improvements in acute care aimed at reducing tissue loss from stroke, there are still hundreds of thousands of patients in the United States alone who become permanently disabled by stroke. To date, post-acute care consists mostly of physical and occupational therapy. While most patients experience at least some recovery, approximately half of patients who suffer a stroke require long-term assistance for activities of daily living. In the past decade, major research efforts were dedicated to investigating the effects of cortical stimulation on post-stroke recovery. Despite success in proof-of-principle animal models and demonstration of safety in small patient cohorts, a large randomized study failed to show improvements beyond those achieved with rehabilitation alone.

We have proposed a different approach for applying electrical stimulation to the brain in an effort to augment recovery. Instead of aiming the electrical field at the cortical surface around the stroke, we have chosen to apply deep brain stimulation (DBS) to the dentatohalamocortical pathway, which projects to frontal, temporal and parietal.

We tested the effects of chronic deep cerebellar stimulation at various frequencies in a rodent model cortical ischemia. Animals

were divided in two groups: chronic stimulation at 30 Hz during the wake cycle, and sham treatment. We found significant improvements in motor function associated with chronic stimulation paired with motor training, relative to sham. In fact, treated animals returned to their pre-stroke baseline motor performance. We also found that chronic stimulation was associated with increased expression of synaptophysin in the perilesional cortex. Follow up experiments aimed at assessing the mechanisms underlying motor improvements showed that DBS significantly increases the number of perilesional synapses as well as expression of markers of long-term potentiation in the perilesional cortex.

**Human Translation:** We are a translational group combining neuroscientists, engineers and clinicians and our goal is to bring this therapy to the bedside. The FDA has just recently approved a phased first-in-man clinical trial aimed at assessing the safety of deep cerebellar stimulation in patients who suffer from long-term hemiparesis after stroke.



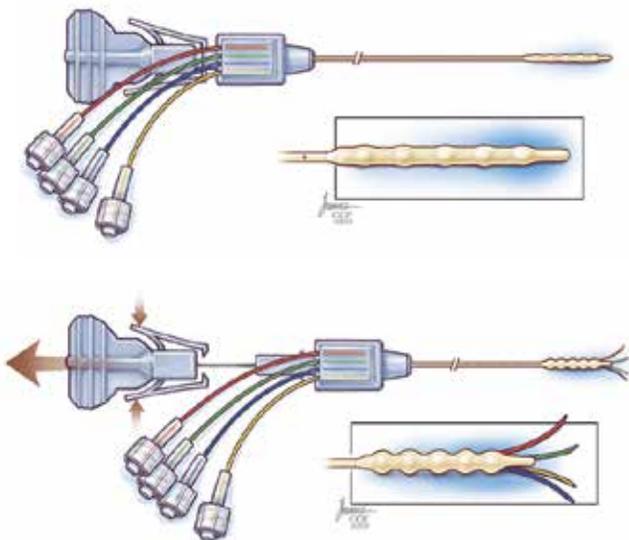
Brain tumors remain resistant to most targeted anti-cancer therapies, in large part due to lack of access of these agents to the cancer cells themselves as a consequence of the presence of the blood-brain-barrier (BBB). Multiple approaches have been undertaken in the past to at least temporarily open the BBB to allow anti-cancer therapeutics to pass into the brain, but these efforts have not produced clinical benefit for gliomas. Furthermore, attempts to re-engineer therapeutics to enter the brain via known endothelial transporters have yet to see clinical success. Another approach for improving the delivery of anti-cancer agents to the brain is direct delivery using a technique called convection enhanced delivery (CED). For CED, therapeutic agents are introduced directly into brain parenchyma via surgically implanted catheters connected to low rate infusion pumps. While this technique has been in use for nearly 2 decades, it remains investigational in nature as there currently are no therapeutics that are approved by the FDA for infusion directly into brain tissue. Over the past decades, several large clinical trials indicated the need for new CED specific technology that would more reliably produce successful delivery to the brain.

Dr. Michael Vogelbaum, Professor of Surgery (Neurosurgery) at CCLCM and Associate Director of the Rose Ella Burkhardt Brain Tumor and NeuroOncology Center had a lead role in some of the CED trials in the early 2000's. Based upon his experience with these trials, and with a developing understanding of the technical limitations that were slowing clinical development,

he approached Cleveland Clinic Innovations (CCI) to create and commercialize new devices for CED. After he and a group of biomedical engineers designed and prototyped a novel type of CED device, Dr. Vogelbaum led a pre-clinical testing effort which validated the reliability of the new design. Next, Dr. Vogelbaum and the CCI team worked together with a team from Parker Hannifin Corporation, a Cleveland-based multinational manufacturing company, to create a clinical version of the new CED device. The final device has four independent microcatheters, and has been named the Cleveland Multiport Catheter (CMC) (**Figure 1**). Following extensive pre-clinical testing and discussions with the FDA, an Investigational New Drug (IND) approval was issued for a first-in-human clinical evaluation of the chemotherapy topotecan delivered by the CMC in patients with recurrent high grade gliomas.

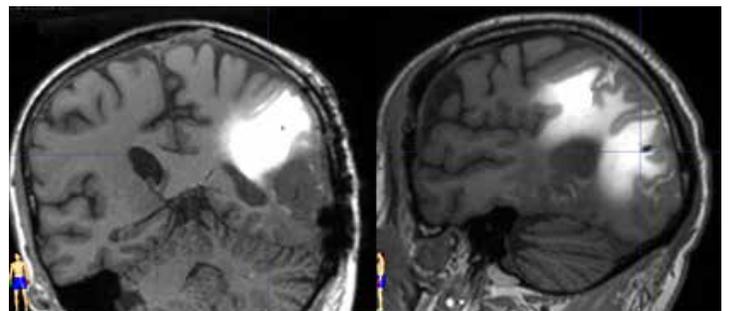
As of March 2016, 9 patients with recurrent glioblastoma have undergone investigational treatment with use of the CMC catheters. These studies have provided the first evidence that the CMC produces reliable and widespread distribution of drugs to the brain parenchyma (**Figure 2**). Based upon these initial results, Dr. Vogelbaum and his team are engaging with pharmaceutical and biotech companies to introduce the CMC into their clinical development of therapeutic agents which require direct delivery into the brain. Progress with the development of the CMC catheters was highlighted as one of 3 notable clinical achievements at Dr. Cosgrove's 2016 Cleveland Clinic State of the Clinic Address.

**Figure 1.**



Cleveland Multiport Catheter shown in undeployed (top) and deployed (bottom) views.

**Figure 2.**



Coronal (Left), and Sagittal (Right) images showing the distribution of the infused topotecan and gadolinium (as a tracer) in tumor infiltrated brain 48 hours after the start of infusion. No intravenous contrast was given; the white areas represent the distribution of the infused gadolinium in the brain.

## resident's corner



CNS Conference 2015: (Left-Right) Drs. Kene Ugokwe ('09), Miguel Lopez ('12), Andrew Healy ('16), Varun Kshetry ('15), Dani Bidros ('11), Chairman Edward Benzel, Jeff Mullin ('17), Sumeet Vadera ('14), Shaye Moskowitz ('07)



Nina Moore, MD, PGY-4

The CCF neurosurgery resident team has had a busy and productive first half of the academic year. With the help of our new army of advance practice providers, the residents are spending more time in the operating room and are able to attend a daily morning film/academic conference after rounding.

There was a good showing of both current and past neurosurgery residents at the Congress of Neurological Surgeons Conference this past fall in New Orleans as seen in the picture below with Neurosurgery Chairman, Dr. Benzel.

The resident team celebrated the holiday season with a series of fun holiday gatherings -- all with delicious food, drink and excellent company. The Resident Holiday Party was kindly hosted by Dr. Schlenk (Program Director) and his family at their home. A great time was had by all as the particularly brave sported their ugly holiday sweaters. Each event had their highlights; two, of the many, from Dr. Barnett's Brain Tumor Center Holiday Party were the 18-foot Santa Darth Vader and the elegant Christmas decorations. Dr. Rasmussen's Cerebrovascular Center Holiday Party was a sophisticated evening at the Club at Hillbrook.



Dr. Barnett's Holiday Party 2015: (Left-Right) OR Nurse Manager Kelly Greer, OR Nurse Kathy Zobec, Dr. Jeff Mullin, OR Scrub Nurse Ashley Rovanseck, OR Nurse Bobbie-Jo Hollingsworth, Dr. Kevin Walsh.



Drs. Jeff Mullin and Kevin Walsh striking poses with Darth Vader

Most recently, we hosted visiting professors Dr. Russell Lonser (Ohio State University), and Dr. Eric Leuthardt (Washington University in St. Louis) who gave the Locke lectures presenting their most recent research. The residents learned a great deal and have a renewed motivation to aspire to their high caliber of research and academic endeavors.

Things are busy at the Clinic and many exciting things are occurring. We have the annual Neurological Institute Research Day (NIRD) of presentations and posters from resident research projects in May, as well as plans for numerous project presentations at the American Association of Neurological Surgeons Annual Meeting in Chicago. We are also anxiously awaiting the results of the neurosurgery match to find out our next class of interns. Finally, plans are underway for another graduating class to complete their training with a graduation celebration in June.

# Neurosurgical Residency Updates

## How Resident Services are Structured Today

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Alex Witek, MD, PGY4

The Cleveland Clinic Neurosurgery Residency Program is in the midst of significant changes as we adapt to meet the ever-changing demands of patient care and resident education.

### Clinical Services

The resident services were re-structured starting in July of this past year. Our residents and staff are organized into three services, each consisting of a chief resident (PGY-7), senior resident (PGY-4), and one or two junior residents. The Staff covered by each of our three services has been rearranged. Team 1 now consists of all cerebrovascular (Rasmussen and Bain) and brain tumor staff (Barnett, Vogelbaum, Angelov, Mohammadi, and P. Recinos). Team 2 covers all of our spine surgeons, including those from Orthopedic Surgery (Benzel, Kalfas, Mroz, Steinmetz, Schlenk, Krishnaney, Orr, and Savage). Team 3 remains unchanged compared to recent years and consists of pediatric (V. Recinos), functional (Machado, Lobel, and Nagel), and epilepsy staff (Bingaman and Gonzalez-Martinez). Nighttime coverage is provided in the form of a night float system, with PGY-2 and 3 residents alternating night float responsibilities on a monthly basis. Our program has also taken on a larger role with the Neurosurgery Services at MetroHealth Medical Center. The Metro Service now consists of a Cleveland Clinic PGY-4 acting as chief resident, and junior residents from both the Cleveland Clinic and University Hospitals programs.

### Midlevel Provider Support

Midlevel providers (MLP's) play an increasing role in the smooth operation of our services. Several new MLP's have been added to our service in the past year. This has allowed for more autonomy for MLP's with regard to patient management, more direct interaction between MLP's and staff surgeons, coverage of pediatric patients, and extended coverage into the evening hours. Each of the three services has two MLP's who co-manage patients on the stepdown unit and regular nursing floor along with the residents, and for some patients they take on full responsibility for patient care with little resident involvement. We will soon have 24-hour midlevel coverage which will allow their service to function independently of the residents for some patients.

### Resident Rotations by Year

The intern year has evolved significantly over recent years, with the most significant change being more time spent on ICU rotations. Interns spend time on each of the three neurosurgical services, as well as in the Neuro ICU (5 months) and on Neuroanesthesia (1 month). Of note, the non-categorical intern program which had been present for several years was discontinued last year. The PGY-2 year is divided among Teams 1-3, and night float. PGY-3 residents rotate between Teams 1-3, MetroHealth, and night float. PGY-4 residents spend three months at MetroHealth acting as a chief resident, and the rest of their time is divided between the three teams at Cleveland Clinic. The resident's 5th and 6th years are dedicated to research or enfolded fellowships. This two-year period continues to be a huge asset to our program. This year we have residents doing research in neuro-oncology and enfolded fellowships in spine, epilepsy, and cerebrovascular surgery. The PGY-7 year serves as the peak of our operative experience, with one third of the year spent as chief resident on each of our three services.

### Curriculum Highlights

In addition to the daily experience obtained by caring for our patients and participating in their operative cases, additional opportunities are available to enhance our education as residents. The skull base and spine lab curriculum allows residents to practice new techniques on cadavers with faculty guidance. Beginning last year we have made an effort to have each resident spend one day per week in the outpatient clinic where we participate in surgical decision-making and follow up the outcomes of patients we have treated as inpatients. Month-long endovascular, radiosurgery, and functional rotations have been added for junior residents to provide greater exposure to these areas. We have also instituted daily morning didactic conferences led by senior residents.

The Cleveland Clinic Neurosurgery Residency Program remains as strong as ever. We are well equipped to meet the needs of today's patients and trainees, and we are ready to adapt as needed to continue providing world-class patient care and resident education for years to come.

## Birth Announcements

### Congratulations to our residents:

- Dr. Ryan Brennan (PGY-7) and his wife, Suzi, on the birth of their daughter, Caroline born on October 15, 2015.
- Dr. Rupa Juthani (PGY-6) and her husband, Viral, on the birth of their son, Kayshar Rayan Juthani, who was born on February 9, 2016.
- Dr. Kevin Walsh (PGY-6) and his wife, Sara, on the birth of their son, William Alexander Walsh, born on February 26, 2016.

### Everyone is home and doing well!



Caroline Brennan



Rupa, Viral and Kayshar Juthani



William Walsh

## Stay Connected!

We encourage our alumni to stay connected with former colleagues, mentors, associates and friends. You can receive news updates about your training specialty and view events on the digital calendar including CME course information.

## CME Online

For CME information on all medical specialties, visit the Center for Continuing Education's website, [ccfme.org](http://ccfme.org), a leader in online CME with a worldwide outreach and record-setting CME numbers.

On the site you can:

- Claim credit for CME activities
- View your transcript
- Reprint certificates
- Create an account in minutes!  
New profile: [ccfme.org/newprofile](http://ccfme.org/newprofile)
- Login: [ccfme.org/cmelogin](http://ccfme.org/cmelogin)

You can earn CME credit by reading articles from *Cleveland Clinic Journal of Medicine*, either online or in print. Visit <http://ccjm.org/> for a current issue of *Cleveland Clinic Journal of Medicine* and more information.

## Alumni Profile

Please click on <http://my.clevelandclinic.org/alumni/my-alumni-profile.aspx> to update your alumni profile.

## Feedback

Feedback for our newsletter is always welcome, as are your suggestions for future content. We would like the Alumni Update column to feature updates about marriages, births, promotions, retirements, vacations, hobbies, etc that you would like to share. Photos are especially welcomed! Please send your announcements or photos to Christine Moore at [moorec2@ccf.org](mailto:moorec2@ccf.org).

Cleveland Clinic is an independent, nonprofit, multispecialty academic medical center consistently ranked among the top hospitals in the country by U.S. News & World Report. Founded in 1921, it is dedicated to providing high-quality specialized care and includes eight community hospitals, 16 family health centers, an education institute and a research institute.