

# The Reading Room



## Note from Our Chair



J. Mark McKinney, MD  
Radiology Chair

Greetings and welcome to the second issue of *The Reading Room*, the Radiology Department Newsletter. Following the first issue, I was glad to hear from several readers about their enthusiasm for our department. The UTMC Radiology Department continues to strive for excellence in patient care, education, and research. Our latest initiative has been to provide 24/7 in-house staff radiologist presence for our patients, residents, and referring physicians. This is a challenging commitment for all of us as we deliver health care in a constantly evolving paradigm.

In this issue I would like to increase your awareness and understanding of the Radiology Department's involvement with the Molecular Imaging and Translational Research Program (MITRP). This program has been a leading example for research in our department and the Graduate School of Medicine. The MITRP is indebted to many before us who have led the way including Dr. Ed Buonocore, Dr. Karl Hubner, Dr. Gary Smith, and Dr. David Townsend. Mr. Shannon Campbell has worked diligently in this issue to introduce you to current MITRP faculty and their research. I would be remiss if I did not also take this opportunity to welcome Dr. Yong Bradley to our Radiology Department as the new Medical Director for the MITRP. Dr. Bradley is boarded in both Radiology and Nuclear Medicine. He joins us on April 4.

Enjoy *The Reading Room*!  
J. Mark McKinney, MD, Chair

## Welcome Dr. Yong Bradley

UTMC Radiology is honored to welcome Yong Bradley, MD as our new Medical Director of the MITRP. Board certified in Radiology and Nuclear Medicine, Dr. Bradley brings a broad spectrum of imaging experience to our program. He comes to UT from his current position as Chief of Radiology at Brooke Army Medical Center in San Antonio Texas, having served in this role since 2006. In prior duty from 2001-2007, he served as the Chief of the Nuclear and Molecular Imaging Division, during which he was the Director of the Nuclear Medicine Fellowship Program.

A West Point graduate and 25+ year veteran, Dr. Bradley brings with him an accomplished academic career, having earned a rare "A" Designator honor by the military in 2006, signifying equivalency as a Professor. He has trained physicians in Radiology and Nuclear Medicine,

## New Appointment

earning multiple "Teacher of the Year" awards, as well as teaching Nuclear Medicine Technologists. Dr. Bradley is a well-published journal author and active lecturer covering a variety of Molecular Imaging topics and techniques, including PET/CT imaging. From 2007-2009, he served as co-chairman for the Resident Review Course given at the annual Society of Nuclear Medicine meeting. Dr. Bradley is a graduate of the Medical College of Georgia and completed his Diagnostic Radiology Residency at Tripler Army Medical Center in Honolulu, Hawaii. We look forward to his arrival and joining our team.



Yong Bradley, MD

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## Special News

### 3T MR Installed and Scanning

In our Fall 2010 issue, we announced that UTMC Radiology would get a Siemens Verio 3T MRI suite installed. We are pleased to announce that our new scanner is installed and running a full patient schedule including weekends. The superior image quality is especially appreciated in neuro, musculoskeletal, and body applications.

By last fall, building construction into the MRI courtyard beside the Emergency Department was well underway. The outside shell was completed in October. The interior construction and shielding were finished in November (Below). The main scanner body was delivered on a cold December 13th day with snow on the ground from the night before (Right). Since then, ferromagnetic safety detectors have been installed with the integration of the scanner room to the new Heart Hospital and waiting room. Our other MRI scanners have also been upgraded during his time.

We are grateful to MRI Lead Tech Stephanie Guinn and Biomedical Engineering's Bud Moore for sharing these great pictures with us. Thank you both!



Bottom 2 pics show the installation of vibration-dampening baffles.



Construction views of the wing addition and interior magnetic shielding



(L-R) MRI's Lead Tech Stephanie Guinn and Technologist Megan Heichelbach



Kathleen Hudson, MD

## The New ABR Exam

The ABR has a new board format which will be effective in the summer of 2013. The residency class entering training on July 2010 will be the first group to experience the “new” board exam.

The Qualifying Exam will be administered after 36 months of training. This exam will be an “Image-Rich, Computer-Based” exam. The exam will cover all the core areas of radiology including physics. Regional testing centers will administer this exam. The exam will consist of over 500 questions and will be administered over 1.5 days. A resident will be permitted to condition up to 3 sections and retake those sections only over the next few months. If a resident conditions more than 3 sections, they must retake the entire exam.

The Certifying Exam will be administered 15 months after the resident completes the residency training. The radiologist can select up to 3 areas of concentration (Neuroradiology, Pediatrics, etc). General radiology may also be selected. There will also be



James T. Boyd, MD

## Congratulations!

The Radiology Residency Committee is pleased to announce that Dr. James Boyd has been named as an Assistant Radiology Residency Program Director. He will team up with Drs. Hudson and Allen as they continue working toward a positive future for the program. Dr. Boyd is extremely excited over this opportunity and enjoys every minute spent teaching residents.

## Note From Our Program Director

general questions that all radiologists should be able to answer, such as contrast reactions, radiation safety, etc.

The changes in the board format have necessitated curriculum changes. All of the core rotations must be completed in three years. The fourth year will be flexible with residents allowed to select areas of concentration or sub-specialization.

Extensive curriculum revisions are currently in progress at our program. The physics curriculum has been changed to span three years with use of RSNA modules and clinical application of physics principles in all modalities.

The Association of Program Directors in Radiology (APDR) is working to assist programs in the curricular changes and resources to implement the needed changes.

I am currently involved with the APDR and have submitted questions for the core exam to the ABR. It is an exciting time but also one of much change. The nostalgia of the Oral Exam of Louisville will soon be no more. I am currently an Oral Board Examiner for Breast Imaging and will participate in my third Oral Board exam this May. It is much more enjoyable as an examiner!!!!

## Residency Announcements

## Residents Receive iPads

Last fall, The University of Tennessee Medical Center Radiology residents were given the option of receiving new Apple iPad® electronic notebooks in lieu of traditional printed textbooks. The main goal was to improve the resident learning experience by giving them flexible access to content whether it is annotated lecture slides and videos in the classroom, interactive anatomy and Medical imaging apps, or journal articles for evidence-based practice. Given that radiology is a technology-intense field, having residents learn how to adapt to new technology is a skill in and of itself.

Radiology resident, Ted Chang, likes that the iPad allows for reading of electronic books on a lit screen, which is useful in dark reading rooms. He is also excited about the fact that he has access to a consolidated library so that all your reading materials such as textbooks, journal articles, web pages, etc. are at your hand. His favorite apps include Evernote for online syncable note taking and indexing, iAnnotate and GoodReader for PDF reading, and Keynote for PowerPoint-type presentation making and viewing, just to name a few.

Jason Hill, Co-Chief resident, said the iPad has allowed him to read and highlight e-books and journal articles, watch review

videos, review cases and study material for board preparation, check work e-mail, and has significantly decreased the amount of printed paper that he carries daily.

While early adopters and researchers are still determining the e-notebook's utility in the clinical setting, it is clear that it has been a great addition to the resident's toolkit for learning.



(L-R) Senior Residents Rob Thurman, MD, Jason Hill, MD, and Monty Smith, MD

## Radiology Program Spotlight

### MITRP - Molecular Imaging and Translational Research Program

We proudly focus on MITRP as a key asset in UTMC Radiology's profile. Continuing into its 9th year, MITRP has established itself as a unique opportunity for clinicians and scientists to collaborate on the discovery and evaluation of novel imaging biomarkers and new clinical imaging techniques.

#### On the Cover of Blood

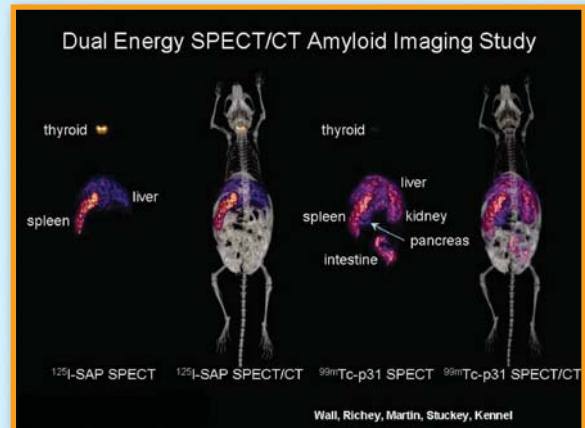
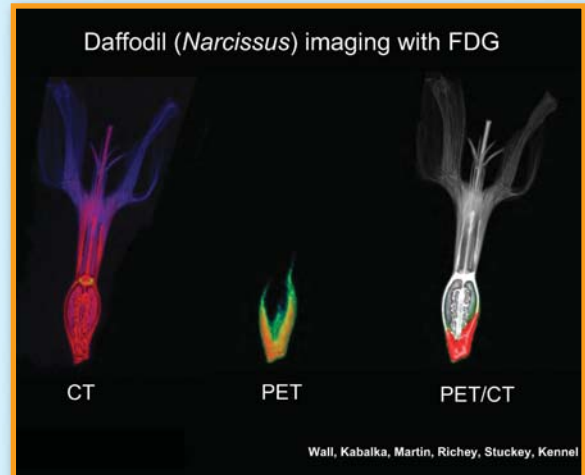
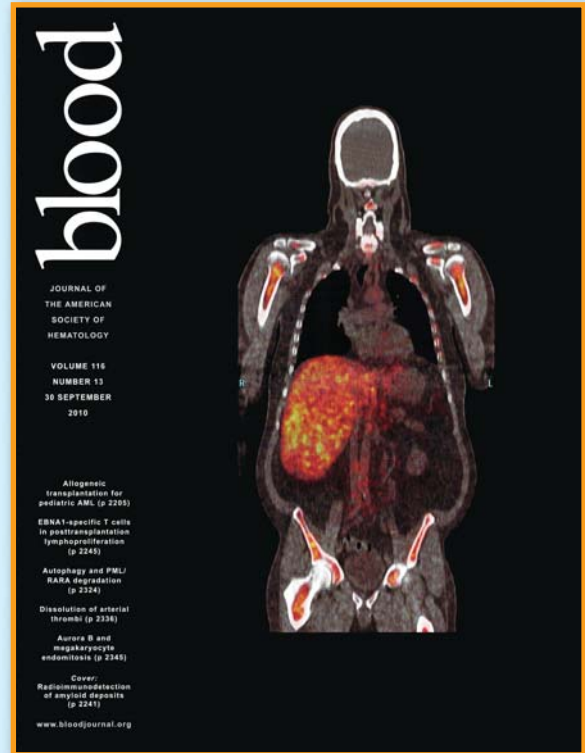
Last fall, MITRP was honored to have one of their images chosen for the cover of *Blood*, the Journal of the American Society of Hematology. The image was made with their new amyloid tracer "11-1F4" and was part of data published in the same issue. The impressive image shows distinct distribution of amyloid deposits in liver and bone marrow in a patient with AL Amyloidosis. (see image, Right) Contributing authors included MITRP researchers, physician faculty from UTMC Departments of Radiology and Internal Medicine, and Vanderbilt Radiology, as well as GSM staff and MITRP imaging technologists.

#### More Imaging Accolades

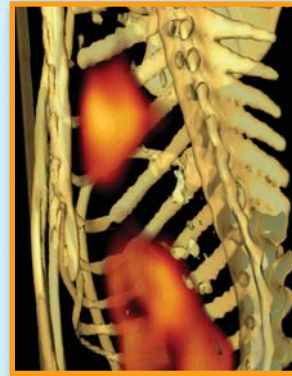
The Preclinical and Diagnostic Molecular Imaging Lab (and thus MITRP) brought home more accolades last year by winning two industry image competition awards for studies using their Siemens "Inveon™" small-animal scanner. The "Best Presented Image of the Year" award came from amazing PET/CT scans showing glucose uptake in a daffodil flower. This work was performed to support a basic research grant application submitted by MITRP team member and distinguished scientist, **George Kabalka, PhD**, Director of Research and the Robert H. Cole Chaired Professor. The "Best Inveon Image of the Year" award was won for a Dual Energy SPECT study comparing the amyloid-binding of two tracers in the same mouse - the industry standard, serum amyloid P-component [SAP] marker, and a novel peptide called "p31" developed in the PDMIL. (see images, Right)

#### A Brief History

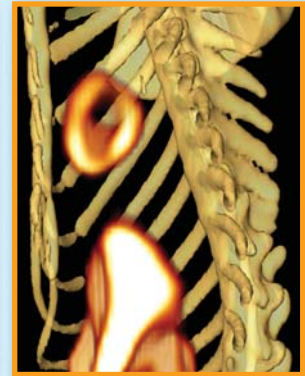
MITRP was created in 2003 at The Graduate School of Medicine with the objectives of building a "world-class molecular imaging center" that is competitive for National Institutes of Health (NIH) research funding. This initiative was spearheaded with the development of PET/CT imaging by renowned scientist **David Townsend, PhD** who came to Knoxville to work with **Ron Nutt, PhD** co-founder of local PET technology corporation, CPS Innovations (now Siemens Molecular Imaging). In 2000, the PET/CT scanner was named by *TIME Magazine* as the medical invention of the year. Dr. Townsend who retains an Adjunct Professorship with us in the GSM is now head of the Singapore Bioimaging Consortium ([http://www.sbic.a-star.edu.sg/research/psd/people.php?id=David\\_Townsend](http://www.sbic.a-star.edu.sg/research/psd/people.php?id=David_Townsend)) and Professor at The National University of Singapore.



UTMC and MITRP can also claim ‘world-class’ clinical imaging expertise with active participation by former Radiology Attendings, **Karl Hubner, MD** and **Myrwood Besozzi, MD**. Both worked here in UTMC Radiology in the earliest days of PET from the late 80’s, helping to establish this cutting-edge technology as a life-saving, as well as cost-effective clinical diagnostic tool. A project worth quick note here is one that is rapidly progressing to human clinical trial. UTMC Cardiologist Dr. Besozzi has been collaborating to test a fatty acid tracer ( $^{18}\text{F}$ -FTHA) “Palmitate” for imaging the heart that may prove to be superior to the traditional  $^{18}\text{F}$ FDG glucose tracer. Fatty acids similar to FTHA are the diseased heart’s preferred energy source. FTHA has been imaged for the first time in feline myocardium by MITRP, showing promising specificity. (see image, Right)



$^{18}\text{F}$ -Glucose in feline myocardium



$^{18}\text{F}$ -Palmitate in feline myocardium

### MITRP Group Profiles

Three of our current joint-faculty researchers are **Jonathan Wall, PhD**, **Stephen Kennel, PhD**, and **Amy LeBlanc, DVM**. Protein biochemist Dr. Wall came to UTMC first in mid-90’s to work with Department of Medicine’s **Alan Solomon, MD**. With the partnership resources of Radiology and Siemens, a Preclinical and Diagnostic Molecular Imaging Lab (PDMIL) was initiated to evaluate new probes for imaging amyloid protein deposits in diseases such as Amyloidosis, Alzheimer’s and multiple myeloma. Dr. Wall holds joint appointments in GSM Departments of Medicine and Radiology, as well as at UT’s College of Veterinary Medicine. Radio-biochemist Dr. Stephen Kennel came to UTMC in 2005 from a 20+ year productive career creating tumor-targeting, antibody tracers and testing their therapeutic activity in animal models at Oak Ridge National Lab. Dr. Kennel holds joint appointments in Departments of Medicine and Radiology. Our newest member, Veterinary Oncologist Dr. Amy LeBlanc joined us in 2009 as Director of MITRP in a joint appointment that is shared with UT’s College of Veterinary Medicine. She directs translational research through implementation of large animal modeling and guidance on study design.

The unique resources of our group must also include key support personnel that ultimately make MITRP so productive. Imaging Technologist **Misty Long, RT(R)(N)** worked with Dr. Townsend in the outpatient PET/CT center from its inception. She coordinates all of the clinical trial scanning of human patients. Imaging Technologist **Alan Stuckey, CNMT** coordinates imaging of all of the pre-clinical animal studies. Both trained here at UTMC and both first worked in Radiology’s Molecular Imaging division prior to joining the program. Both have also presented data at conferences, in keeping with another MITRP objective to “develop, evaluate, and validate the highest performance PET/CT methodology”. The program’s USFDA-required mouse colonies are expertly managed by Tina Richey, MS, allowing testing of novel tracers in animal models of human disease. Looking to the future, MITRP has now also recruited two PhD candidates, **Joshua Schaefferkoetter** studying Physics and **Emily Martin** studying Image Analysis. In 2008, the group added Administrative Coordinator **Melissa Weaver** who is well-loved with her 19 years of experience at UTMC in the Departments of Radiology and Surgery.



### MITRP (L-R)

Richard Laine, MD  
George Kabalka, PhD  
Karen Wells, MD  
Alan Stuckey, CNMT  
Stephen Kennel, PhD  
Melissa Weaver (back)  
Emily Martin (seated)  
Amy LeBlanc, DVM (back)  
Misty Long, RT(R)(N) (seated)  
Mark McKinney, MD (back)  
Murthy Akula, PhD (front)  
Myrwood Besozzi, MD  
Jonathan Wall, PhD (back)  
Karl Hubner, MD (front)  
Jason Schaefferkoetter

## Radiology Section Spotlight

### MITRP (continued)

#### Service

In her “service mission” role of providing support for molecular imaging for UT’s College of Veterinary Medicine, Dr. LeBlanc stays busy by maximizing use of MITRP’s resources. Using their research-dedicated, full-size Siemens “mCT” (Biograph™ Molecular CT) scanner, Dr. LeBlanc has performed the first-ever normal, ‘control’ biodistribution studies of <sup>18</sup>FDG in a variety of species (cats, dogs, birds and pigs) that will serve future veterinary patients, as well as future disease model comparisons. As for current patients, one recent study was performed as a surgical follow-up to check for recurrence of melanoma in a 36 year old penguin from the Knoxville Zoo. Another fascinating collaboration came in the opportunity to image bald eagles and other birds of prey from a local raptor sanctuary at Dollywood (see image, Right).

#### Final Thoughts

When asking Drs. LeBlanc, Wall, and Kennel, “Who does what?”, their respective roles in MITRP aren’t so neatly defined. The three emphasized that productive research that will ultimately benefit patients is multi-disciplinary and really is a team effort. Ideas can come from anyone, are investigated by everyone, and with shared-credit, are reported with inclusion of everyone. The enthusiastic message was that MITRP is a unique setting with state-of-the-art resources, a focused



You may have seen this patient at Dollywood!

Thanks to Misty Long for sharing these photos.

group with diverse and complimentary expertise that can dynamically respond to create solutions for researchers of all levels.

Dr. Wall admits to spending much more of his time these days just ‘developing’ research by writing grant proposals, doing a lot of PR and seeking out new funding sources. He notes, “I can’t stress enough how important ‘soft-money’ donations are in determining the program’s future plans to get new projects going.” With nurturing, MITRP’s first decade of promise will continue to blossom into a very bountiful future.

## Special Tribute



Karl F. Hubner, MD

It is our privilege to thank Karl F. Hubner, MD (Professor Emeritus) who recently “retired” again from MITRP and UTMC. His first official retirement from Radiology was back somewhere in the mid-early 2000’s, but it’s difficult to remember exactly when because Dr. Hubner kept on working in molecular imaging research. His continuing contributions were noted with last year’s co-authorship on an

article on clinical PET/CT imaging published in the Journal of Nuclear Medicine.

Remembered fondly by those lucky enough to have met and worked with him, Dr. Karl Hubner is a true pioneer in clinical research, always looking to create the future. He returned to the United States in 1967 after practicing Pediatrics and Hematology for several years in Germany, to join “in cancer therapy research involving total-body radiation and bone marrow transplantation”, fields still in their infancy being developed at Oak Ridge’s ORAU Medical Division. He had been in Oak Ridge previously from 1962-64, after Medical School to train in Nuclear Medicine at the time it was being invented. From 1970, Dr. Hubner would spend the next 12 years on staff there, the last 5 directing the ORAU Radiation Emergency Assistance Center/Training Site which still trains

medical personnel and our residents today.

Dr. Hubner joined the staff at UTMC Radiology in 1984 being a key player in developing the first clinical site in the United States using Positron Emission Tomography (PET). It was his early interest in diagnosis and detection of cancer and leukemia with x-rays and radiotracers that led him into imaging. At UTMC, Dr. Hubner wrote and coordinated the submission of all FDA-required research INDs and IRB proposals for PET studies. During his career, Dr. Hubner generously gave his time training fellow MDs, as well as research graduate and technologist students who were inspired by his keen enthusiasm and personal compassion.

Here are a few thoughts by his long-time colleague in UTMC Radiology, Dr. George Kabalka:

“When Karl and I joined the Department in 1984, it was a much smaller place. We interacted almost daily in developing the UTMC PET Center. Under the leadership of Dr. Ed Buonocore, Karl (along with Drs. Woody Besozzi and Gary T. Smith) spearheaded nearly all of the clinical parameters related to the PET Center while I focused on the physical sciences and supporting laboratories. Through the years, Karl’s expertise and extensive experience in Nuclear Medicine imaging played a key role in the success of our PET program.”

\*Human Radiation Studies: Remembering the Early Years; Oral History of Hematologist Karl F. Hubner, MD. DOE/EH-0470. Interview: 1994, Dec. 30. DOE: Oral Histories.

## Faculty Profiles



Front (L-R): Li Yong, PhD, George Kabalka, PhD, Murthy Akula, PhD, and Srinivasa Reddy Marepally, PhD  
Back (L-R): Min Liang Yao, PhD, Thomas M. Moore, Aarif Shaikh, PhD, David Blevins, and T. Lee Collier, PhD

*The Reading Room* asked Dr. Kabalka and his colleagues to tell us about some of their history and current work here in UTMC Radiology.

### George Kabalka, PhD

I joined the Department in 1984 when Dr. Buonocore returned with plans to bring in, the then brand new (not reimbursed), MRI and PET imaging technologies, creating the "Biomedical Imaging Center". At the time, Radiology consisted of six physicians and me as the sole PhD researcher.

My role has been and remains to develop science technologies to support clinical research. In the mid 80's, MRI was our primary research focus, but gradually evolved to Nuclear Medicine studies after the installation of the PET scanner in 1987. Since then, we have attracted over 4 million dollars in Federal research funds which has allowed me to expand the group from one to the current level of sixteen (including PhD Students.) The expansion allowed me to recruit one of my earliest and most productive post-doctoral fellows, Dr. Murthy Akula, to oversee our

(Right) Dr. Kabalka receives the 2010 "Excellence and Leadership in Basic Science Research" award from Dean James Neutens of UTMC's Graduate School of Medicine.



radiopharmaceutical production operations.

Current areas of emphasis include the development of PET radiopharmaceuticals for use in pre-clinical and clinical studies focused on amyloid diseases, cancer, and cardiology. The group supports the MITRP's efforts in clinical research and basic science. Active collaborations are in place with researchers at ORNL, Penn State, Cornell, Ohio State, as well as the UT College Veterinary Medicine.

Over 400 research publications have resulted from our studies thus far, including 14 in the past year.



(L-R) Former Radiology Chair Ed Buonocore, MD and George Kabalka, PhD attempt to 'manually install' UTMC's first MR gantry.

### Former Kabalka Post-Docs are "Back to the Future"

#### T. Lee Collier, PhD

I started at UTMC as a post-doc with Dr. Kabalka in 1991. Since then, I have held various positions in government, academic and companies such as ANSTO (Australian Nuclear Science and Technology Org.), Berkeley National Labs, Duke, Columbia University Medical Center, PETNET/CTI/Siemens. I am with Advion BioSystems, being used by the MITRP with Dr. Kabalka's group for the preparation of PET imaging radiotracers and support in the advanced training of the instrument. I am currently a visiting scientist in Radiology at the Graduate School of Medicine working with Dr. Murthy Akula.



(L-R) Lee Collier and Murthy Akula stand with a Nano-tek® microfluidic system used to make tracers.

#### Murthy Akula, PhD

I worked with Prof. Kabalka, in the Department of Radiology as a post-doctoral associate between 1994 and 2002. During that period I made several radiiodinated tracers to evaluate the neurological diseases such as Alzheimer's dementia and Parkinson's. In 2002, I took a job at Perkin-Elmer in Boston as a Scientist to custom synthesize C-14 labeled pharmaceuticals for various drug companies. I came back to the Department of Radiology in 2008 as an Assistant Professor to work on microfluidic syntheses of various PET radiotracers to be used in pre-clinical trials organized by the MITRP.

## Recent Events

### Radiology Christmas Brunch 2010

For radiology employees and their families who were gathered at The Foundry for the Association of University Radiologists' annual Christmas party, it was a day for creating memories. AUR treated everyone to a wonderful Christmas brunch consisting of eggs Benedict, country ham, pancakes, quiche, raspberry crème crepes, assorted pastries, and an abundance of seasonal fruits. The historic building, festive music, and Christmas decorations all worked together to create the memorable occasion.

Approximately halfway through the meal, taking center stage was a surprise visit by Santa Claus and his special elf all the way from the North Pole! The excitement was palpable as children of all ages broke out into smiles and laughter. Soon, one by one, they began to gather in the age-old tradition of bygone eras for a chance to sit in Santa's lap. None were more prepared though than Wally Money's four-year-old son, Caleb, as he wasted no time pulling out his list. Leaving nothing to chance, he began to read over each item one by one, occasionally glancing up just to make sure Santa was really paying attention.

Before long, everyone, young and not so young, got a chance to spend time with Santa in hopes that this year would be a very special Christmas indeed.

Thank you, AUR!

