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President's Letter

Cindy T. Hipps, B.H.S., R.T. (R)(MR)



My year as President is flying by! I would like to thank you, the membership, for allowing me to serve you as the SMRT President. It is truly an honor to work with such dedicated and distinguished MR professionals in this organization.

The SMRT Policy Board met in Chicago at RSNA. This is one of the two meetings held each year for the entire Policy Board. The Executive Committee meets more frequently to discuss issues as they arise by teleconference. At the meeting in Chicago, a presentation was made by **Heidi Berns**, *RCEEM Chair*, concerning the SMRT's application to the ARRT to become a **Recognized Continuing Education Evaluation Mechanism** of the ARRT. Acceptance would allow the SMRT to accredit MR educational activities. We have recently heard from the ARRT that our application has been approved. I would like to thank Ms. Berns and her committee for preparing this intense document. We look forward to implementing this new and exciting project!

John Christopher, *SMRT Education Committee Chair* and **Nanette Keck**, *SMRT Program Chair*, have been working diligently with their committees on the final phases of planning the Annual Meeting to be held in Miami in May. See the results of their efforts on page 5. You will not want to miss this meeting as it will be one for the record books. I encourage each of you to make plans to attend because flights are inexpensive, room rates are affordable, and the registration fee is the lowest in the industry for quality MR education. While there, you can help me congratulate the committees on their outstanding efforts!

Julie Lowe, *SMRT External Relations Chair*, attended the Health Professionals Network (HPN) meeting in Salt Lake City, Utah in September. She helped to moderate the Associated Sciences Consortium at RSNA. She is scheduled to attend the Alliance Meeting in Washington, DC in the spring along with myself. The CARE Bill and RadCARE Bill have yet to be passed and are scheduled again this legislative session. The SMRT supports the passage of these bills since they support federal educational requirements for imaging professionals. If you would like more information about this, please contact Julie or myself. Julie is working hard to network with our colleagues while promoting our profession and she is doing a wonderful job!

A turning point for the Society is the retirement of **Jane Tiemann** as Executive Director of the ISMRM. Jane has served the ISMRM since the time it was first formed from the merger of its predecessor societies on January 1, 1994. She began work with the Society of Magnetic Resonance in Medicine in January 1990 as Publications Coordinator, and became Assistant Director in March 1992. Jane was appointed Executive Director of SMRM in September 1992. She held that post until February 1994, when she was appointed Executive Director of the International Society for Magnetic Resonance in Medicine. Except for the inaugural month of the Society, she has been the only Executive Director the Society has ever had! To quote **Walter Kucharczyk**, *ISMRM President*, "Jane Tiemann has been an incredible asset to the ISMRM. She has shown vision, excellent

organizational skills, and a disciplined management style." On behalf of the SMRT Executive Committee and Policy Board, I would like to thank **Jane Tiemann, ISMRM Executive Director** for her leadership and support of the SMRT and its mission. Jane, you will be missed by us all!

Nominations/Awards Chair, Maureen Ainslie reports to the membership in this issue on the results of the recent election of new Policy Board members and officers of the SMRT. Maureen and her committee are to be commended for the excellent ballot choices provided to the membership. For the first time in the history of the SMRT, there was a tie with the recent election. With the guidance of **Jennifer Olson, Associate Executive Director**, the tie was broken by an anonymous ballot sent to all Policy Board members. We are thankful for her leadership. I am looking forward to working with the newly elected individuals in the future as they help to provide new and fresh ideas within the SMRT.

The Executive Committee is still hard at work developing the first ever SMRT Strategic Plan. The goal is to have a working document by the annual meeting in May. The leaders of YOUR organization want to provide bigger and better member benefits. One of the ideas that came in this process is already at work. You can now access the *MR Pulse* newsletter via the ISMRM Website. Go to <http://www.ismrm.org/pulse/index.html> and sign in using your SMRT (member number) password.

I would like to end by thanking all the SMRT Committee Chairs, Committee members, Executive Committee, Policy Board members and ISMRM/SMRT Central office for your support to me as President and for your loyalty to the SMRT and our mission. We are truly blessed with these individuals that give of their personal time and energy in an unselfish manner. I am truly grateful to you all! ●

Editor's Letter

Julie Strandt-Peay, B.S.M., R.T. (R)(MR)



Greetings.

This issue of *Signals* is crammed with news for you beginning with up to date information and thoughts from President **Cindy Higgs**.

We hear from the ISMRM Executive Director, **Jane Tiemann** as she bids us farewell. We wish her well in her future endeavors. **Anne Sawyer-Glover**, Home Study Editor announces the latest offering which is mailed with this issue of *Signals*.

Nanette Keck, Program Chair presents the plans for the Annual Meeting and the daily listing of didactic presentations on page 5. It's not too late to make arrangements to attend this educational meeting and come together with your fellow MR technologists from all parts of the globe. **Todd Frederick** is coordinating the joint forum with the ISMRM this year. This session has become an opportunity for MR technologists and radiographers to join with scientists and physicians in a unique learning experience. A preview of the quality of material submitted to the annual meeting can be seen in the President's Award paper on page 6.

Maureen Ainslie, Chair of the Nominating Committee announces the newly elected SMRT Policy Board members who begin serving at the Miami meeting. Also beginning her three year term is President-Elect **Cindy Comeau**. Also, Chair of the Awards Committee, **Maureen** shares with us those among us who have been recognized for their contributions to the SMRT and the field of MR Imaging.

External Relations Chair, **Julia Lowe** reports the recent activities of her committee. **Jane Johnson** and **Anne Sawyer-Glover** describe the program and events of the SMRT West Regional Educational Seminar. Rounding out this issue is our resident MR safety expert, **Frank Sherlock**, with information about the use of contrast agents and pregnant patients.

Enjoy this issue and remember that your comments and suggestions are welcome. ●

Farewell Message from the ISMRM Executive Director

Jane E. Tiemann



For the past 15 years, it has been my honor and pleasure to serve, first, the Society of Magnetic Resonance in Medicine and, second, the International Society for Magnetic Resonance in Medicine. During that

time, I have witnessed many changes both in the Society and in the field of MR. When I joined the staff of the SMRM in 1990, the Society had just under 2000 members, attendance of 2200 at the Annual Meeting, and there was no SMRT. We had a rudimentary database system that needed tweaking every week, we did most of our "instant" communication by fax, and there was not one session on functional MRI at the Annual Meeting.

Fifteen years later, the membership of the ISMRM is over 5,000, the SMRT has 1,500 members, and we expect an attendance of 3,500 – 4,000, including technologists, at the Annual Meeting in Miami. Not only is fMRI a well-established and vibrant field, but we are also seeing exciting work on molecular and cellular imaging, parallel imaging, and constant refinements of MRI in all organ systems, all at field strengths barely thought of in 1990.

The Society, too, has grown in sophistication and importance. Since the merger of SMRM and SMRI into ISMRM in 1994, we have moved from the fax machine to the World Wide Web, maintaining and refining a powerful database system to support our member services, and replacing the heavy and cumbersome paper Annual Meeting Proceedings with an easily transportable and searchable CD-ROM, among many other changes. The SMRT has established its very successful home study program and steadily increased its international membership.

None of this tremendous progress would have been possible without the tireless dedication of the members of

Continued on page 3 ➡

ISMRM and SMRT to advancing MR science and its clinical applications. At the same time, the Society itself could not have reached the position it holds today without many of these same members volunteering their time and energy to serve on all the Society's standing and ad hoc committees and the Board of Trustees. The Society we know today is also due to the commitment and diligence of the staff in the

Central Office. Each staff member, every day, makes it her or his aim to serve the members of ISMRM and SMRT in a way that meets their needs and fulfills the goals of the Society, whether the staff member is answering a question, processing dues payments, negotiating hotel contracts, coordinating CME activities, or keeping the books.

It has been a privilege to witness and to participate in these changes and more. I have learned many new things, met many wonderful people, including Nobel Laureates, and traveled to many exciting places. I would like to thank each and every one of you for affording me this life-changing opportunity and to send all of you my very best wishes for the future. ●

Update on SMRT Educational Seminars Home Study Program

Anne Marie Sawyer-Glover, B.S., R.T. (R)(MR), Editor



We are pleased to present the SMRT Educational Seminars, Volume 8, Number 1: "Atlas of Knee Anatomy." This is the twenty-seventh home study developed by the SMRT, exclusively for the SMRT members.

It has been my experience that comprehensive, high quality, and reasonably priced MR atlases are few and far between. We are, therefore, delighted to be able to provide this *Atlas of Knee Anatomy* for your reference. One reliable approach to learning anatomical structures in MR images is to have the atlas present at the scanner for convenient reference. We hope that these SMRT anatomy home studies will be the atlases that you use often and refer to while scanning. Future issues depicting other anatomical structures and discussing physiology are currently being developed.

A special thank you to Kelly Baron for sharing her expertise in human anatomy and MR imaging with the members of the SMRT. Kelly has provided didactic education in magnetic resonance imaging to students, both M.D. and R.T., as an instructor in college and university classrooms and worked as a MR technologist for many years. I am very fortunate to collaborate with Kelly, from whom I learn volumes, on this second anatomy atlas for the SMRT.

Thank you to Thomas M. Grist, M.D., for contributing the MR angiography images of the lower leg. Dr. Grist is the Robert Turell Professor of Imaging Science, Department of Radiology, University of Wisconsin, located in Madison, Wisconsin, USA. Dr. Grist is well known in the MR and Radiology communities worldwide for his many peer-reviewed publications and contribution to educational symposia. This is a beautiful example of TRICKS, the MRA technique developed by Dr. Grist and his collaborators at the University of Wisconsin [3D Time Resolved Imaging of Contrast Kinetics, Korosec et al, *Magn Reson Med*. 1996 Sep;36(3):345-51].

Thanks to Nancy Beluk and Kelly for writing the questions that comprise the quiz for which continuing education credits are redeemed. Thank you to Dr. Christopher Beaulieu, Chief of Musculoskeletal Imaging at Stanford University Medical Center for sharing his knowledge and input in the review of the text and labeling of the MR knee images.

Thank you to Wendy Baumgardner, R.V.T. for her many hours of volunteering the perfect knee for MR imaging. The images were acquired at the 3.0T whole body MR system (G.E. Healthcare) using a four-channel phased array knee coil (MRI Devices Corporation) at the Richard M. Lucas Center for MRS/I at Stanford University School of Medicine, Department of Radiology.

Finally, thank you to Greg Brown, SMRT Publications Chair, and in the Berkeley, California, USA office of the ISMRM/SMRT, Sheryl Liebscher, Publications Manager, and Jennifer Olson, Associate Executive Director, for their insight and long hours supporting these educational symposium.

The SMRT welcomes and actively seeks out articles written by technologists and radiographers as a contribution to our home studies program. Sharing information with your peers is not only a worthy endeavor, it furthers the technology and results in improved healthcare overall. It is also a valuable addition to your resume or *curriculum vitae*.

Accreditation (USA) for all home study issues of the Educational Seminars is maintained annually by the SMRT. Back issues may be obtained from the SMRT/ISMRM office located in Berkeley, California, USA for twenty dollars (USD) each. For a complete list of back issues, please go the SMRT Website: www.ismrm.org/smrt. If you live outside of the U.S. and have interests or questions concerning accreditation within the country you reside, please contact me at amsg@stanford.edu or +1 650 725 9697.

If you are looking to become more involved in the SMRT, please consider writing questions or an article for one of our home studies. The instructions for writing questions will be posted on the SMRT Website in the near future. For additional information, please contact me directly or Jennifer Olson, ISMRM Associate Executive Director, at the SMRT Office in Berkeley, California, USA (smrt@ismrm.org, +1 510 841 1899).

Finally, I would like to thank Tom Schubert, John Wilkie, and all of those fantastic people at **Invivo** (formerly MRI Devices Corporation) who support our home studies program, *SMRT Educational Seminars*. Their continuing support of technologist and radiographer education brings quality continuing education to the SMRT membership worldwide. ●

2005 Program Update

Nanette Keck, R.T., Chair, 2005 SMRT Program Committee



South Beach, Florida is calling one and all to a weekend of exceptional MR education, beautiful views, and a celebration of the past. The SMRT presents *“Riding the Waves of MR Excellence,”* 6-8 May 2005.

Friday night’s Poster Exhibit and Walking Tour Reception will start off the weekend 6 May 2005 at 18:30. The attendees will be able to meet the authors and ask questions about the many emerging technological advances displayed.

Saturday morning, 7 May 2005, will begin the didactic portion of the program along with the proffered paper presentations. The program committee worked diligently to provide a wide range of very qualified speakers to satisfy the clinical and research interests of the membership. We are privileged to have the SMRT founding fathers, Drs. John Crues and Herbert Kressel, presenting during the program! The first 300 registrants will receive the book, *“Reference Manual for Magnetic Resonance Safety, Implants, and Devices: 2005 Edition”* by Frank Shellock, Ph.D. The SMRT Business Meeting will take place at lunchtime. Awards will be given to the most outstanding papers and posters submitted in both the clinical and research arenas. The didactic portion will continue with a Cardiac Forum completing the day.

All attendees are invited to the Past Presidents Reception for Saturday evening, 7 May 2005 at 19:30 at the Miami Lowes Hotel. We have already received sponsorship for this event. You will not want to miss this exciting opportunity to relax with your colleagues as you enjoy food, fun and entertainment.

Sunday, 8 May 2005 will provide more exciting speakers along with an Educational Forum rounding off the day. There may even be a few things flying around!

The SMRT and ISMRM Joint Forum Presentation will be held at 14:00, Monday, 9 May 2005. Your registration for the SMRT Annual Meeting allows you to attend this presentation. This year the forum topic will be titled *“Optimizing the Pulse Sequences and Protocols,”* chaired by Gareth J. Barker, Ph.D., and Todd Frederick, R.T. (R) (MR). This two-hour forum will present the process of developing and optimizing pulse sequences and protocols from various perspectives. The forum by design is a grand collaboration of energy and talent between the ISMRM and the SMRT, which continuously promotes the highest quality of education in the MR field.

Plan now to make your arrangements to attend this wonderful educational opportunity. Please visit <http://www.ismrm.org/05/housing1.htm> to view your housing options and book your hotel reservations on line. We look forward to seeing you in Miami Beach! ●

2005 SMRT and ISMRM Joint Forum

Todd Frederick, R.T. (R)(MR), Co-chair, 2005 SMRT and ISMRM Joint Forum



The topic of the SMRT and ISMRM Joint Forum for the 2005 Annual Meeting is *“Optimizing Pulse Sequences and Protocols.”* I have the pleasure of organizing the forum with Gareth Barker, Ph.D., who represents the ISMRM.

There is a clinical focus to the 2005 meeting. The topic of the forum was chosen to coincide with this clinical focus. It will be an interesting session for Technologists/Radiographers who want to learn more about how the sequences they use are created to begin with, and how physicians design imaging protocols for different clinical questions.

Dr. Barker, from London, England, will speak on the methods of pulse sequence design. He will discuss the hardware and software that control the pulse sequences. The pulse sequence designer’s role is key in compensating for artifacts and imaging pitfalls, and Dr. Barker will share with attendees the strategies for combating these pitfalls.

Technologists/Radiographers have the task of optimizing sequences on a daily and patient-by-patient basis. I will speak on how Technologists manipulate the parameters of

the MR pulse sequence in order to achieve the desired image quality.

Achim Gass, M.D., from Germany will speak on the process of developing and optimizing Neuro protocols. Different pulse sequences are advantageous for different anatomical areas and clinical indications. Dr. Gass will give examples of how these advantages are used to provide the best diagnostic information.

Gary Israel, M.D., from New York University, will provide the perspective on the design and optimization of Body MRI protocols. Like Dr. Gass, his focus will be on the strategies behind the use of different pulse sequences for different applications.

The SMRT and ISMRM Joint Forum is always interesting and informative for SMRT members. The 2005 forum will be practical, clinical, and interesting. The forum generally draws a large crowd, and we would love for the SMRT to be well-represented. The forum is on the afternoon of Monday, 9 May, from 14:00 to 16:00. The information gained will be worth the extra day’s stay in Miami Beach. We hope you will join us. ●

SMRT Program: Riding the Waves of MR Excellence

FRIDAY EVENING, 6 MAY 2005, 18:30-20:30

Poster Presentation and Poster Walking Tour Reception

SATURDAY, 7 MAY 2005, 07:45-17:00

07:45 **Welcome**

Cindy T. Hipps, B.H.S., R.T. (R)(MR), SMRT President 2004-2005

Announcements

Nanette Keck, R.T. (R)(MR), 2005 Program Chair

Morning Moderator— Muriel Cockburn, D.C, R.B.Sc. (Hons.) P.Gd. Cert. MRI

08:00 **MR Arthrography of the Shoulder: Direct and Indirect Approaches**

Michael Zlatkin, M.D.

08:35 **Lower Extremity MR**

John Crues, M.D.

09:10 **Time-Resolved MRA**

Frank Thorton, M.D.

09:40 Break

09:55 **Clinical Scanning Techniques**

William Faulkner, B.S., R.T. (R)(MR)(CT)

10:30 **Proffered Papers: Volumetric Measurements in MR Improve Neuro Assessments and Analysis**

10:30 **2nd Place Research Focus: The Identification of Structural Brain Anomalies Associated with IQ Decline in Preterm Children**, Heather Ducie, B.Sc. (Hons), R.T.

10:40 **The Relationships Between MRI Findings and Epilepsy in Very Preterm Born Children**, Jane Ho, B.Sc. (Hons), R.T.

10:50 **3rd Place Research Focus: Optimization of High Resolution 3D Volumetric Scans to Differentiate Gray Matter and White Matter at 3 Tesla Using 8 Channel Brain Array Coil**, Renee Hill, R.T. (R)(MR)

11:00 **1st Place Research Focus: N-acetylaspartate Whole Brain Spectroscopy**, Hina Jaggi, M.S., R.T. (R)(MR)

11:15 **MR Artifacts**

Greg Brown, R.T.

11:45 SMRT Business Meeting and Awards Luncheon

Afternoon Moderator — Robin Avison, R.T. (N)(MR), C.N.M.T.

13:00 **Breast Imaging**

Todd Frederick, R.T. (R)(MR)

13:35 **Proffered Papers: Improved Imaging Techniques in Clinical MRI**

13:35 **3rd Place Clinical Focus: New Applications for Color Flow Imaging in MR**, Jane Johnson, R.T. (R)(MR)

13:45 **MR Cholangiopancreatography (MRCP): High and Low TE Techniques in the Clinical Setting**, Jane Johnson, R.T. (R)(MR)

13:55 **2nd Place Clinical Focus: Dynamic Female Pelvic Floor Imaging**, Hina Jaggi, M.S., R.T. (R)(MR)

14:10 **Registry Readiness**

Carolyn K. Roth, R.T. (R)(MR)(CT)(M)(CV)

14:45 Break

15:00 **Cardiac Forum— Roundtable Discussion**

Moderator— Michael Kean, R.T.

General Anatomy and Imaging, Michaela Schmidt, R.T.
Diseases and Abnormalities, Peter Hunold, M.D.

Advantages and Pitfalls of 3 Tesla Cardiac Imaging, William Woodward, A.R.M.R.I.T.

Functional Analysis Reporting by Magnetic Resonance, Cindy R. Comeau, B.S., R.T. (N)(MR)

19:30 SMRT Past Presidents Reception— Miami Loews Hotel

SUNDAY, 8 MAY 2005, 07:45-17:00

07:45 **Welcome**

Karen Bove Bettis, R.T. (R)(MR), President 2005-2006

Announcements

Nanette Keck, R.T. (R)(MR), 2005 Program Chair

Morning Moderator — James J. Stuppino, B.S., R.T. (R)(MR)

08:00 **Neuro Imaging at 3.0T**

Steven Falcone, M.D.

08:35 **Neuro MRA**

Elke Gizewski, M.D.

09:10 **HIV Dementia MRI and MRS**

Robin Avison, R.T. (N)(MR), C.N.M.T.

09:40 Break

09:55 **Proffered Papers: MRI Techniques Convey Functional Data**

09:55 **1st Place Clinical Focus (Tie): Using Ungated FIESTA to Obtain Volumetric and Functional Measurements in the Cardiac MR Exam**, David Stanley, BS, RT(R)(MR)

10:05 **1st Place Clinical Focus (Tie): Functional Kidney MRI with Combined Perfusion and MR Angiography**, Filip De Ridder, R.N.

10:15 **Diffusion-Weighted Echo-Planar MR Imaging of the Parotid and Submandibular Glands Before and After Stimulation**, Anna Kirilova, R.T. (R)(MR)

10:30 **Pediatric Cardiac/Abdomen MR Imaging**

Michael Kean, R.T.

11:05 **Pediatric/Neuro MR Imaging**

Susan Blaser, M.D.

11:40 **President's Award Proffered Paper: Parametric Mapping of Hepatic Perfusion Index in Patients with Colorectal Cancer**, John Totman, D.C.R. (R) M.Sc.

11:55 Lunch

Afternoon Moderator — Carolyn Bonaceto, B.S., R.T. (R)(MR)

13:00 **Comprehensive Assessment of Disease with Large Anatomic Coverage**

Silke Bosk, R.T.

13:35 **The Current State of Imaging in the Abdomen at 1.5T and 3T**

Herbert Y. Kressel, M.D.

14:05 Break

14:20 **MR Safety**

Frank Shellock, Ph.D.

15:00 **MR Educators Update**

Moderator— Todd Frederick, R.T. (R)(MR)

JCERT Update, Luann Culbreth, R.T. (R)(MR)(QM) M.Ed.

Teaching Methods and Techniques, Carolyn K. Roth, R.T. (R)(MR)(CT)(M)(CV)

Writing Effective Objectives and Exams, Sonja K. Belville, A.S., R.T. (R)(MR)

Current Issues in MR Education, Todd Frederick, R.T. (R)(MR)

17:00 Meeting Adjournment





2005 President's Award—

Parametric Mapping of Hepatic Perfusion Index in Patients with Colorectal Cancer

J. Totman,¹ M. J. White,² R. O'Gorman,³ L. Moore,² P. Kane,¹ J. Karani,¹ M. O. Leach²

¹Department of Radiology, Kings College Hospital, London, United Kingdom.

²Cancer Research UK Clinical MR Research Group, Institute of Cancer Research, Sutton, Surrey, United Kingdom.

³Department of Medical Engineering and Physics, Kings College Hospital, London, United Kingdom.

Purpose

Colorectal cancer is one of the leading causes of death from cancer in UK, and a significant factor in this mortality comes from associated metastatic disease. Approximately 25% of patients have occult metastases at the time of primary resection.¹ These smaller lesions are known to respond favourably to treatment but are largely undetectable with standard imaging techniques. One approach for detection is based on the alteration in liver blood flow that develops after metastatic seeding in the liver. The HPI, the ratio of hepatic arterial to total liver blood flow, was first investigated using dynamic scintigraphy and found to be abnormal in 94% of patients with colorectal liver metastases.² Equivalent marker indices have been developed for dynamic CT and Doppler ultrasound, and previous studies have demonstrated that the CT methodology can be readily adapted to MRI.³ However, all previous studies have utilised a region of interest (ROI) approach, which is limited insofar as it cannot be used to localise changes in liver perfusion within or outside the regions selected. This study applies the HPI methodology to 3D parametric mapping of liver perfusion.

Methods

The patient group consisted of six men and four women, (age 44-75) with confirmed primary colorectal cancer and liver metastases evident on imaging. The controls were of seven men and two women, (age 21-58), taken from patients referred for routine contrast-enhanced spine imaging with no history of neoplastic disease. Imaging was performed with a Siemens 1T Harmony scanner using a modified volume interpolated breath hold examination (VIBE) sequence⁴ and a manual bolus injection of 0.2 ml/kg Gd-DTPA. The CT methodology described by Blomley et al⁵ was used to calculate overall perfusion properties for the liver, and adapted for voxel-based mapping of relative hepatic and portal perfusion. Time series data from individual liver voxels were smoothed (using the LOWESS local regression algorithm⁶) to allow robust detection of the peak liver uptake gradient prior to maximum splenic enhancement (ie during arterial phase). The peak gradient of splenic enhancement was determined using an ROI of the spleen and the ratio of the splenic and hepatic arterial gradients determined. The time course of splenic enhancement, scaled by this ratio, was used to model the hepatic arterial contribution to voxel perfusion; this was then subtracted from the time course of each voxel. The resulting estimated portal component was similarly smoothed and a peak uptake gradient found during portal phase. These peak gradients, obtained during both arterial and portal phase, represent an estimate of perfusion; HPI was calculated as the ratio of the apparent hepatic arterial perfusion to the total (hepatic and portal)⁵ perfusion. Maps of this quantity at each point in space were produced.

Results

Significant differences were found between the overall hepatic perfusion index calculated for the patient and control groups ($p=0.002$) with patients demonstrating significantly higher hepatic perfusion and lower portal perfusion.³ This phenomenon

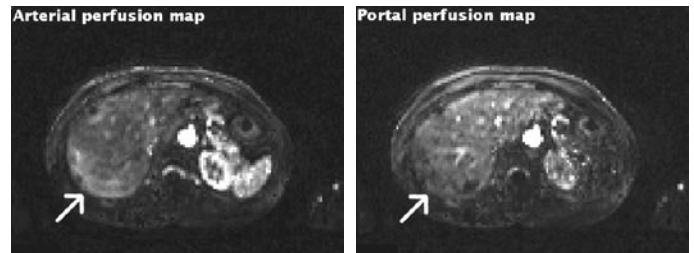


Figure 1.

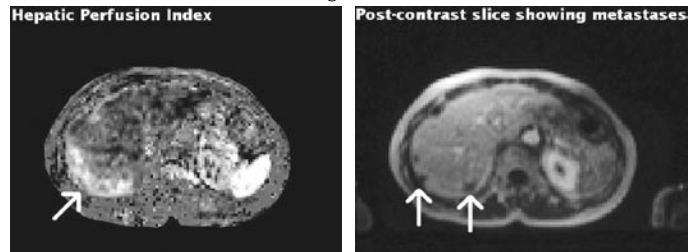


Figure 2.

was also evident in patient HPI maps, with increased HPI in extended regions around visible metastases. Figure 1 shows the arterial (left) and portal (right) phases of perfusion for a patient with known liver metastases (age 73). The calculated HPI map for this patient is shown in Figure 2 (left). A conventional post-contrast image of the same slice, with two small metastases highlighted, Figure 1 is shown in Figure 2 (right).

Conclusion

The map in Figure 2 (left) demonstrates a region of increased HPI in the pericapsular aspect of the right posterior liver segments. The increased arterial and decreased portal perfusion within this region is indicative of an abnormal arterialisiation of perfusion, which, in view of the known capsular metastases adjacent to the anterior, superior, and lateral aspects of the right liver, shown in Figure 2 (right), is suggestive of further metastatic pathology. The extent of this abnormally perfused region is somewhat larger, Figure 2 and more clearly delineated, than the capsular metastases visible on the conventional contrast-enhanced images, and indeed the individual arterial and portal maps. Follow-up work is needed to confirm whether this change in HPI is representative of underlying tissue pathology.

The hepatic perfusion index can be visualized by post-processing dynamic contrast-enhanced MR data. This may provide a useful tool for the detection and localisation of abnormal perfusion associated with occult metastases. ●

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4. Lee, V. et al. *Radiology* 2000;215:365-372.
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6. Cleveland, W.S. *J Am Stat Assoc* 1978;74:829-83.

Election Results

Maureen Ainslie, M.S., R.T. (R)(MR), SMRT Past President,
Nominations and Awards Committee Chair



As chair of the Nominations Committee, I am pleased to announce the successful candidates for the SMRT Policy Board 2005. These candidates include **Anne Dorte Blankholm**, Center for Functionally Integrative Neuroscience, Aarhus, Denmark; **Vera K. Miller**, Shields Health Care, Boston, Massachusetts, USA; **Steven P. Shannon**, EPIX Pharmaceuticals, Cambridge, Massachusetts, USA; **Charles T. Stanley**, University of Virginia Medical Center, Charlottesville, Virginia, USA; and **Pamela S. Vincent**, National Institutes of Health, Bethesda, Maryland, USA.

These candidates will serve on the Policy Board for three years and represent the membership. I am also pleased to announce **Cindy T. Comeau** as President-Elect 2005. Cindy will serve as President-Elect and assume the office of President at the Annual meeting in 2006 Annual Meeting in Seattle, Washington, USA.

I am also delighted to congratulate the recipient of the Crues-Kressel Award, **William Faulkner**. The Crues-Kressel award has been presented since 1991 to one individual per year who the SMRT membership feels has made "outstanding contributions to the education of magnetic resonance technologists." Bill has served the MR community for many years and continues to support SMRT and technologist education. ●

SMRT Announces Award Recipients

Maureen Ainslie, M.S., R.T. (R)(MR), SMRT Past President,
Nominations and Awards Committee Chair

The SMRT recognizes the contributions of two of its members by electing them as Fellows of the Section. This award implemented in 2001 states that: Fellows must have made significant and substantial contributions to the mission of the SMRT over the course of at least five (5) years including participation in the Annual Meetings, Regional Meetings, and Publications, and contributions to the development of the Section. This year I am pleased to announce that **Michael Kean** and **Anne Marie Sawyer-Glover** have been selected for this honor.

SMRT members previously receiving Fellowship awards are:

2001 Luann Culbreth and William Faulkner
2002 Kelly Baron and Julie Strandt-Peay
2003 Robin Greene-Avison
2004 Heidi Berns and Carolyn Kaut Roth

Award recipients will be recognized during the Business Meeting at the SMRT Annual Meeting, Saturday 7 May 2005. ●

2005 CRUES-KRESSEL AWARD WINNER



William Faulkner, B.S., R.T. (R)(MR) (CT), is currently working as an independent consultant with his own company, providing MRI education and operations consulting. In November 2002, Bill was voted "Most Effective Radiologic Technologist Educator" by on-line voting at AuntMinnie.com. He is also partnered with Carolyn (Candi) Roth as a co-owner of OutSource, Inc., which provides MRI education including Internet-based home study programs. Bill is the author of "Rad Techs Guide to MRI: Basic Physics, Instrumentation and Quality Control." He is the co-author of "Review Questions for MRI," "OPEN MRI," and "The Physics of Clinical MR Taught Through Images." Bill is an active member and Fellow of the Section for Magnetic Resonance Technologists (SMRT), the ISMRM Safety Committee and a member of the technical advisory board of the Institute for Magnetic Resonance Safety, Education, and Research.

2005 FELLOWS OF THE SECTION



Michael Kean, R.T., has been a member of the SMRT for many years. He served as a Policy Board member and recognized a need for MR focused technologist meetings in Australia and New Zealand. He also was an integral member of the Australian Institute of Radiography MR accreditation process.

He has been a member of SMRT program committees and has been an invited speaker at numerous meetings throughout Australia and the U.S. He has assisted

with three SMRT home studies as a reviewer and question compiler and is currently writing a Pediatric safety article for an upcoming issue. He is the author of the regular pediatric section within the *Signals* newsletter. The members of the SMRT value his careful work and dedication to advancing the practice of MR.



Anne Marie Sawyer-Glover, B.S., R.T. (R)(MR) In 1994, Anne was elected to the Policy Board of the SMRT. Since then she has chaired the Regionals Committee, served the SMRT as President-Elect, President, Past President, and Chair of the Nominating and Awards Committees. In May 2001, the membership awarded her the Crues-Kressel Award for outstanding contributions to MR technologist education. She served a three-year term as the Treasurer and in January of 2004 began a five-year term as Editor of the home study program, *SMRT Educational Seminars*.

Anne has presented many papers at SMRT annual meetings and is regularly invited to speak at local, national, and international meetings. She serves on the Safety Committee of the ISMRM and organized the first Joint Forum with the ISMRM on MR Screening and Safety. The SMRT members appreciate her contributions and diligence in serving the MR community.

President-Elect and Policy Board Members

2005 SMRT PRESIDENT-ELECT



Cindy R. Comeau, B.S., R.T. (N)(MR), received her B.S. degree in Radiological Technology from the University of Nevada, Las Vegas, in 1985. She is registered by the ARRT in Nuclear Medicine (1986) and Magnetic Resonance (1997). Cindy feels that the role of the MRI technologist is ever evolving in many applications and without the SMRT, today's issues facing MRI technologists would be very challenging to overcome.

She strongly feels that the dynamics of the SMRT organization provide excellent avenues that allow technologists with any skill level to participate in many educational activities. Cindy is honored to have been elected as President-Elect of the SMRT and is looking forward to serving in this important role.



Steven Shannon, R.T. (R)(MR), is a Registered Radiologic Technologist with advanced certification in Magnetic Resonance Imaging. He is currently employed as a Senior Applications Technologist at EPIX Pharmaceuticals in Cambridge, Massachusetts, USA, where he is involved in the development of novel protocols currently being used in clinical trials of contrast-enhanced MR angiography, as well as pre-clinical imaging with contrast agents in early development.

Steve considers the SMRT to have been instrumental in his career, providing an opportunity for continuing education in the latest MR technologies and for peer networking. He is honored to be elected, and hopes to contribute more to the future of the SMRT.

NEW SMRT POLICY BOARD MEMBERS



Anne Dorte Blankholm, R.T. (MR), Pg.D. in MRI, qualified as a Radiographer in 1987. After that she worked for two years in a neuroradiological department. In 1989 her MR career began when the first scanner in the western part of Denmark was installed. She is brimming with enthusiasm for MR and for encouraging an in-depth knowledge of the SMRT in Scandinavia. There is so much MR activity in Denmark where MR education is not

formalized it would be a great challenge to start a local chapter of the SMRT in the Scandinavian countries. She is looking forward to contributing to the development of the international scope of the SMRT.



Charles T. Stanley, C.R.A., R.T. (R)(CT)(MR), is a Registered Radiologic Technologist with advanced certification in Magnetic Resonance Imaging, Computed Tomography, and Radiology. Presently, Charles is working as the Manager of CT and MRI in the Department of Radiology, University of Virginia Medical Center in Charlottesville, Virginia, USA. He is a charter member of the CVMRS and currently serves as its president. Charles is also a member of

the ASRT, CMRS, AHRA, and the VSRT. Charles is honored to be elected to the SMRT Policy Board and looks forward to the opportunity to serve in an organization as esteemed as the SMRT.



Vera K. Miller, B.S., R.T. (MR), attended the University of Central Arkansas and the Baptist School of Radiology in Little Rock, Arkansas, USA. She completed Radiology school in the spring of 1981 and received her B.S. in Health Care in the fall of the same year. She worked in CT and Ultrasound at the Baptist Hospital and obtained RDMS certification in 1984 until the introduction of MRI in the winter of 1985. Vera believes that we must all work together

to promote and provide quality education and training. The SMRT plays a vital role in the development of both the technologist and the profession. She welcomes the opportunity to be a part of this work and believes that her 20 years of MR experience will be a benefit to the SMRT and the Policy Board.



Pamela Vincent, M.P.A., R.T. (R)(MR)(M)(CT), is a Registered Radiologic Technologist with advanced level certifications in MRI, CT, and Mammography. She holds a Bachelor of Science degree in Health Care Administration from Lebanon Valley College, and earned a Master of Public Administration Degree with a concentration in Health Care from the Pennsylvania State University, USA, in 1996. Currently employed as a Cardiac MRI Research Technologist at

the National Institutes of Health in Bethesda, Maryland, USA. She is currently a member of the SMRT Education Committee, and is a question writer for the SMRT home study program. Pam feels honored to have been elected to the SMRT Policy Board. She will apply her knowledge and experience to further the goals of this organization and its members.

External Relations Report

Julia Lowe, B.S.R.T. (R)(MR), Chair, External Relations Committee



During RSNA, 2004 the Associated Sciences Consortium hosted the Session: ***“Emergent Trends-Global Perspectives”*** on Tuesday morning. As External Liaison of the SMRT, I was selected to moderate the session. Maureen Hood, the previous External Liaison organized the session and was in attendance to greet the speakers and provide support. The three speakers covered the topic of *“Image-Guided Therapeutics.”* Dr. Stephen Hushek spoke on *“How to Set Up a Successful Intraoperative MRI Lab.”* Dr. David Lu spoke on *“Liver Tumor Ablation”* and Dr. Wilfrido Casteneda-Zuniga spoke on *“Endovascular Interventions.”* The session was well-attended and well-received.

The Planning Meeting for the Associated Sciences Consortium of the RSNA was held 31 January 2005 in Chicago. The committee spent time finalizing the selected refresher courses for RSNA 2005. In an effort to enhance technologist attendance the courses will be arranged in three vertical tracks on Monday, Tuesday and Wednesday for RSNA 2005. Courses scheduled on Thursdays have been poorly attended in the past.

The SMRT External Liaison was asked to serve on the RSNA Recognized Continuing Education Evaluation Mechanism, (RCEEM) Committee. This committee met during RSNA 2004 on Wednesday. The educational material for RSNA will be reviewed beginning in May for continuing education, (CE) credit approval for RSNA 2005. The committee is striving to improve on providing session CE information by publishing the course description and amount of approved CE credits on the RSNA 2005 website prior to the meeting.

The Alliance for Quality Medical Imaging & Radiation Therapy Meeting will be held in Washington D.C. 14-15 March 2005. The SMRT President and External Liaison will attend and review the proposed Health and Human Services, (HHS) Draft Regulations document. Representatives from many Radiology organizations will work together to see the CARE bills enacted in the 109th Congress and our draft regulations promulgated by HHS shortly thereafter. For more information on the CARE Act go to <http://thomas.loc.gov/home/thomas.html> and search for the bill number, HR1214.

I would like to thank Maureen Hood for helping with my transition to External Liaison. Maureen is an excellent representative of the SMRT and has volunteered many hours of her time to our organization. She has created or strengthened relations of the SMRT with important organizations such as the Alliance which supports the CARE bill, the Health Professions Network and the Associated Sciences Consortium of RSNA. ●

Report on the SMRT West Regional Educational Seminar

Jane W. Johnson, R.T. (R)(MR), West Regional Co-Chair

Anne Sawyer-Glover, B.S. R.T. (R)(MR), West Regional Co-Chair

The two-day SMRT West Regional Educational Seminar began on Saturday, November 6th at Stanford University in Palo Alto, California. Eighty-Five attendees gathered to learn, exchange information and network on the beautiful Stanford campus. A continental breakfast was provided prior to the beginning of the 08:00 session.

The first morning session began with Daniel Spielman, Ph.D., Associate Professor at Stanford doing an *Introduction to Magnetic Resonance*, starting with a little history on the imaging modality and working through the basic physics and reconstruction of the resulting image. Michael Moseley, Ph.D., Professor of Stanford University, followed with *MR Image Contrast*, explaining the effects that using contrast has on different tissues during MR scans.

Following the break, James Stuppino's talked on *Optimizing MR Protocols at Mid and Low Field*. He also hit on the topic of considering the larger patient in the MR environment and how we can accommodate and assist with this process in order to make it a more positive experience for this part of the population. Dr. Barton Lane ended the morning session with *MR of the Spine and Brain*, describing protocols of choice and imaging options for these areas.

Lunch was enjoyed in the courtyard adjacent to the meeting room with many opting for the sunny spots, as it was a beautiful day in Palo Alto. Following lunch, *Current Concepts in MRA* was discussed by Dr. Marcus Alley, Research Associate at Stanford. 2DTOF, 3DTOF, use of MT for contrast sequences and 3D dynamic studies were thoroughly reviewed. Phase contrast in 2D and 3D was also discussed.

Larry Chow, M.D., Assistant Professor of Stanford, followed speaking on *MR of the Liver*. Protocols using both breathheld and non-breathheld techniques were discussed as well as preferred sequences for certain pathologies and contrast considerations. Robert Herfkens, M.D., Professor

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Anne Sawyer-Glover and Jane W. Johnson, co-chairs of the SMRT West Regional Seminar at Stanford University, catch their breath during the two day symposium.

Regional Report continued

and Director of MRI at Stanford, enlightened the group on *MR Image Artifacts: Cause, Appearance, and Cure*. This was a popular session due to the issues that are dealt with in the clinical setting on a regular basis by all technologists. Garry Gold, M.D., Assistant Professor at Stanford, closed the Saturday session with *Musculoskeletal MRI at both 3T and 1.5 T*. Protocols for both field strengths and for specific exams were shown.

Sunday was again bright and sunny but the entire group returned at 08:00 to start the final day. After enjoying the provided continental breakfast they took to the meeting room to begin with *The Basics of MR Spectroscopy* session given by Daniel Spielman, Ph.D., which covered voxel placement, pathology and basic physics. Cindy Comeau, B.S., R.T. (N)(MR), Manager of Advanced Cardiovascular Imaging in New York, spoke on *Cardiac MRI— Basic Principles and Applications*. Covering anatomy, positioning, electrode placement and pathology the time flew by quickly with this popular session. The group had many questions and kept Cindy past time.

A well-deserved break was enjoyed in the courtyard. After the break *Diffusion and Perfusion Weighted MRI of the Brain* was the topic of Pratik Mukherjee, M.D., Ph.D., Assistant Professor at the University of San Francisco. Pratik provided thorough information on Diffusion, Perfusion, resultant artifacts, Diffusion Tensor imaging and applications, as well as tractography and some pathology. Then Graham Sommer, M.D., Professor at Stanford, spoke on MR of the Kidneys and Pelvis. This was a popular topic covering protocols, pathology, the advantages of fat suppression and anatomy of both male and female pelvis. The session then broke for lunch.

The afternoon session began with *Parallel Imaging Techniques* explained at length by Anja Brau, Ph.D., Advanced Development Scientist at GE Healthcare. Due to the wide interest in this newer imaging technique it was well received and many questions followed. Due to October being “Breast Cancer Awareness Month” the talk given next by Bruce Daniel, M.D., Assistant Professor of Stanford on *MR Imaging of the Breast* was of great interest to the group. The session covered the scope of imaging for breast cancer and also the challenges of MRI of breast implants.

Following the afternoon break, *MR Contrast Agents* was the topic for Michael Moseley, Ph.D., Professor of Stanford University. Contrast issues in tissue as well as newer blood pool agents and the future of contrast agents and how it would affect the technologist’s choices was covered in this hour. And ending the session Robert Herfkens again spoke on the importance of *MR Screening and Safety*. This is one of the sessions that cannot be repeated too many times as all technologists are the last line of defense in this safety issue. The session ended on a very positive note from all attendees and speakers. We are very happy to report that 37 new members were enrolled in the SMRT by the end of the two-day seminar.

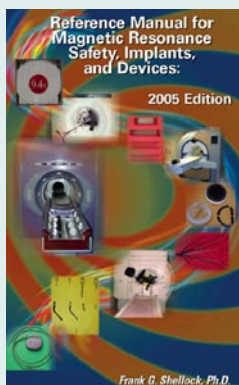


Jane Patrick and Anne Hayes, attendees at the SMRT West Regional Seminar at Stanford University enjoy the sunshine during a break with speaker Cindy Comeau who presented *Cardiac MRI: Principles and Applications*.

We would like to thank Berlex Imaging, Frank Shellock, Ph.D., GE Healthcare, Institute for Magnetic Resonance Safety, Education, and Research (IMRSER), Medrad, Inc., mri.safety.com, ONI Medical Systems, Inc., and Siemens Medical Solutions for their donations and assistance with this seminar.

A special thanks to Stanford University School of Medicine and Department of Radiology for hosting this SMRT West Regional Educational Seminar. Many thanks also to Jennifer Olson for all her assistance with this seminar. And last but not least, we would like to thank all the speakers who gave freely of their time for this weekend. The program was received well by all the attendees and many positive responses were offered to all who participated. ●

The Reference Manual for Magnetic Resonance Safety, Implants and Devices: 2005 Edition is an indispensable textbook for radiologists, MRI technologists, and facility managers. This annually-revised, internationally acclaimed textbook series is a comprehensive resource that includes up-to-date guidelines and recommendations for MRI safety based on the latest peer-reviewed publications. This manual is also the only comprehensive source of information for implants and devices tested for safety in the MRI environment. “The List” now contains tabulated information for more than 1,300 implants and devices, including data for over 300 objects tested at 3.0-Tesla or higher.



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MRI Contrast Agents and Pregnant Patients



Frank G. Shellock, Ph.D., Adjunct Clinical Professor of Radiology and Medicine, University of Southern California; Institute for Magnetic Resonance Safety, Education, and Research, Los Angeles, California, USA
www.MRIsafety.com www.IMRSER.org

This article represents the views of its author only and does not reflect those of the International Society for Magnetic Resonance in Medicine and are not made with its authority or approval.

Studies of low molecular weight water-soluble extracellular substances such as gadolinium-based magnetic resonance imaging (MRI) contrast agents in pregnancy have been limited, and effects on the human embryo or fetus are unknown. A standard gadolinium-based MRI contrast agent has been shown to cross the placenta in primates and appear within the fetal bladder within 11 minutes after intravenous administration. It must be assumed that all gadolinium-based contrast media behave in a similar fashion and cross the blood-placental barrier into the fetus.

After entering the fetal blood stream, these agents will be excreted via the urine into the amniotic fluid and be subsequently swallowed by the fetus. It is then possible that a small amount will be absorbed from the gut of the fetus and the rest eliminated back into the amniotic fluid, the entire cycle being repeated innumerable times.

In the study in primates, placental enhancement could be detected up to 2 hours following the intravenous administration of gadopentetate dimeglumine. When gadopentetate dimeglumine was injected directly into the amniotic cavity, it was still conspicuous at 1 hour after administration. There are no data available to assess the rate of clearance of contrast agents from the amniotic fluid.

The American College of Radiology (ACR) Committee on Drugs and Contrast Media has reviewed this issue extensively and has prepared the following summary of information and recommendations.

Gadolinium-Based MRI Contrast Agents and Pregnant Patients

It is known that gadolinium-based MR contrast media cross the human placenta and into the fetus when given in clinical dose ranges. No adequate and well-controlled teratogenic studies of the effects of these agents in pregnant women have been performed. The ACR recommends that all imaging facilities should have policies and procedures to reasonably attempt to identify pregnant patients prior to the performance of the MR exam, and before the use of MRI contrast media in these patients. The ACR has issued a White Paper on MR safety in pregnancy and related issues that is also consistent with the ACR Committee on Drugs and Contrast Media's recommendation for MRI contrast media.

While there is no compelling evidence of teratogenicity or other adverse effect on the fetus of MR imaging or of gadolinium-based MRI contrast agents, neither the safety of the MR environment nor the safety of the MRI contrast agents in pregnant patients has been established. It is therefore prudent for pregnant patients at any stage of pregnancy to be informed of the risk-benefit ratio that may warrant the performance of an MR scan with or without contrast media. The radiologist should confer with the referring physician and document the following in the radiology report or the patient's medical record:

- (1) The information requested from the MR study cannot be acquired using other nonionizing radiation imaging modalities (e.g., ultrasonography).

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Signals

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- (2) That the information needed affects the care of the patient and fetus during the pregnancy.
- (3) That the referring physician is of the opinion that it is not prudent to wait to obtain this information until after the patient is no longer pregnant.

It is recommended that the pregnant patient undergoing an MR examination with contrast material provide informed consent to document that she understands the risk/benefits of the MR procedure to be performed, and the alternative diagnostic options available to her (if any), and that she wishes to proceed. ●

[Excerpted with permission from the Runge VM. Chapter 12, Safety of Magnetic Resonance Contrast Agents. In: Magnetic Resonance Procedures: Health Effects and Safety. CRC Press, Boca Raton, FL, 2001, pp. 241-260 and the American College of Radiology, Manual on Contrast Media, 5th Edition, 2004; Reprinted with permission of the American College of Radiology. No other representation of this article is authorized without express, written permission from the American College of Radiology.]

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ISMRM/SMRT CALENDAR AND TRAVEL INFORMATION

ISMRM Workshop on Methods for Quantitative Diffusion MRI of Human Brain

13-15 March 2005 The Fairmont Chateau Lake Louise, Lake Louise, Alberta, Canada

ISMRM 13th Scientific Meeting & Exhibition

7-13 May 2005

Miami Beach Convention Center,
Miami Beach, Florida, USA

SMRT 14th Annual Meeting

6-8 May 2005

Miami Beach Convention Center,
Miami Beach, Florida, USA



In South Beach, Miami, Florida, USA, the sun is warm, the sky is blue, and the possibilities are as endless as the waves crashing onto its white, sandy shores. A worldwide destination famous for its lively nightlife, stunning beaches, exquisite shopping, and delectable food, South Beach is jam-packed with things to do and see.

Many hotels offering a range of quality, rates, and amenities have been reserved by the Society for the meeting in Miami Beach, Florida, USA. **Convention Housing Management (CHM)** has been appointed to coordinate all hotel reservations for delegates and exhibitors. In order to get the special convention rate, delegates and exhibitors must make their reservations through the official housing bureau, CHM. More detailed information on the various hotels and the hotel reservation form are included in the ISMRM/SMRT Annual Meeting registration brochure. Do not contact the hotels directly in Miami Beach as reservations are to be made only through the official housing bureau, CHM. Official Society hotels will not honor direct requests for hotel rooms at the special convention rates. Again this year, you may book your reservations online! Visit the ISMRM Website at www.ismrm.org for more information.

Climate The Florida peninsula receives breezes from both the Gulf of Mexico and Atlantic Ocean. South Florida, exposed to daytime onshore breezes, enjoys comfortable temperatures during much of the year. In South Beach, Miami, the average low temperature in May is 72 degrees, with an average high of 87.2 degrees. The sun shines during 72% of May's daytime hours and the average precipitation rate is 5.52 inches.

Customs/Visa All visitors traveling from outside the United States must have a passport for entry into the United States that is valid for six months after international travel concludes. Note that citizens of countries participating in the Visa Waiver Program must present a machine-readable passport upon entry to the United States, otherwise a visa is required. Entry visas are required for travel from some countries. The visa application process must be started as soon as travel to the United States is considered, and at least three to four months in advance of departure date. Please verify the entry documents necessary by contacting your local U.S. Consulate office, or your local travel agent. Detailed visa information is available on the ISMRM Website at www.ismrm.org/05/visainfo.htm. Please review this information carefully to determine whether or not you need to apply for a visa.

Transportation Located in the heart of South Florida in world-renowned Miami Beach, the Miami Beach Convention Center is conveniently situated only minutes from the Miami International Airport via State Road 112 and US195, downtown Miami and the Port of Miami via I-395, Fort Lauderdale and the Palm Beaches via both Interstate 95 and the Florida Turnpike to the Julia Tuttle Causeway (US195). Spanning four city blocks of Miami Beach, the Center is bounded by Washington Avenue on the east, Convention Center Drive on the west, Dade Boulevard on the north, and 17th Street on the south. The Center is only moments from one of America's most spectacular beaches and the South Beach Art Deco district, easily within walking distance.