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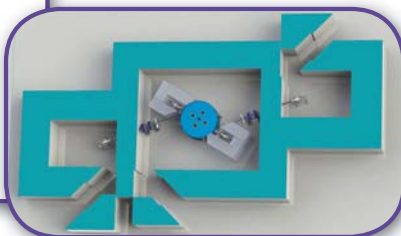
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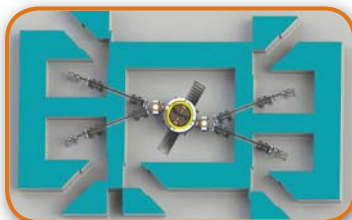
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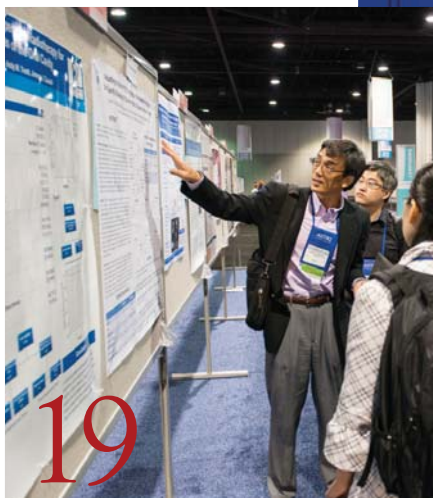
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ASTRO

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SAN FRANCISCO OFFERS A GREAT SETTING FOR ANNUAL MEETING

WELCOME TO THE SPECIAL ANNUAL MEETING EDITION of *ASTROnews*!

This issue is almost entirely devoted to ASTRO's 56th Annual Meeting at Moscone Center in San Francisco. Be sure to read the "Welcome to San Francisco" story (see page 26) by one of my good friends, Amato J. Giaccia, PhD, to learn more about my favorite U.S. city.

San Francisco's sweeping views and architecture are breathtaking. After a punishing walk along the monstrous city hills or a more leisurely jog around the waterfront, I am always ready for my favorite pastime – eating. In addition to Amato's fine restaurant recommendations, I will let you in on a few secret gems. For breakfast or brunch, Dottie's True Blue Café is cozy and busy, with unique egg dishes and delicious fried cornbread. There is always a line, but it is definitely worth it. For any meal, as well as some fun shopping, visit the Ferry Building at Embarcadero. Here, there is a wide variety of everything from cappuccino to delicious baked goods, gelato, dark chocolates, fine cheeses, California wines and five restaurants, including

one of Amato's favorites, the Slanted Door. For dinner, I strongly recommend Delfina, a small restaurant off of Mission Street, with a modern Italian flare and great wine selection. Be sure to make a reservation, but not on Tuesday, as that is when I plan on going, hopefully with Amato.

As Amato mentioned, my second favorite baseball team, the Giants (sorry folks, I am a Boston Red Sox fan) are in town September 12-14 for a series against the Dodgers. I will let all of my ASTRO colleagues in on another secret ... I may be able to score us some free tickets. My husband is a college baseball coach, and has many former players in the big league, such as Brandon Belt and Tim Lincecum on the Giants.

San Francisco also has a rich music scene. Whether a larger venue such as the Fillmore, perhaps best known for being one of the main haunts of The Grateful Dead, or a smaller venue such as Bimbo's, I always check out the concert schedules during my visits. Well, for those 80s aficionados, I am excited to report that both Adam Ant and Blondie will be taking the stage during our visit.

If you are staying for an extended vacation, I strongly recommend visiting the wine country. Calistoga and Yountville, both in Napa Valley, are two wonderful areas, about 90 minutes away. Solage Calistoga is my favorite resort and spa, and Frank Family and Hope and Grace, are two of the best boutique wine tasting venues. If the beach is preferred, drive along the scenic coast, approximately two hours

Whether it is visiting the Exhibit Hall to learn more about novel technologies in radiation oncology or discussing potential novel research designs with both national and international colleagues, the overarching goal of our ASTRO meeting is to advance precision cancer therapy.

EDITOR'S *notes*

away, to Big Sur, and stay in a bed and breakfast in Carmel by the Sea or enjoy an exceptional ocean view at the Hyatt in Carmel Highlands.

Now on to the meeting highlights. This year's theme is "Targeting Cancer: Technology and Biology," chaired by ASTRO President Bruce G. Haffty, MD, FASTRO, which will emphasize the combination of the developments in basic, translational and applied technology and clinical science to improve the outcomes and quality of life for our patients.

This year's Presidential Symposium, which opens the meeting on Sunday, September 14, is focused on "Local-regional Management of Breast Cancer: A Changing Paradigm." The session will highlight three major

topics: local treatment of early-stage breast cancer, local-regional treatment after preoperative systemic therapy and regional nodal management of breast cancer, and will also include discussion and debate on several recent landmark studies and ongoing clinical trials.

Three outstanding keynote speakers will emphasize the need for multidisciplinary care of our patients and draw attention to recent advances in cancer technology and biology: Hedvig Hricak, MD, PhD, chair of the Department of Radiology and Carol and Milton Petrie Chair at Memorial Sloan Kettering Cancer Center, will discuss oncologic imaging and radiogenomics; Frank McCormick, PhD, director of the UCSF Helen Diller Family Comprehensive Cancer Center, will address the promise of biology and targeting in oncology; and Sidney Dekker, PhD, professor at Griffith University in Australia and an expert in human error and patient safety, will examine the culture of safety, as it relates to radiation oncology.

This year marks another record-breaking number of abstract submissions with 2,874 received. With such a great amount of research to present during the meeting, I am excited to report that the Plenary and Clinical Trials sessions will be running unopposed, allowing us all to learn the latest cutting-edge science. Check out the "Top-rated abstracts presented during Plenary and Clinical Trials session"

story on page 15 for a quick overview of some of the abstracts being presented. The Annual Meeting is also a prime opportunity to hear more about interesting research in biology and physics. Track chairs Indrin J. Chetty, PhD, MS, and Felix Y. Feng, MD, give us a sampling of this research in a story on page 16 (see "Annual Meeting offers highly rated physics, biology research").

In addition to the more than 50 educational sessions, 20 panel discussions and numerous poster presentations, the Annual Meeting is a prime opportunity for networking. Whether it is visiting the Exhibit Hall to learn more about novel technologies in radiation oncology (see the full list on page 42) or discussing potential novel research designs with both national and international colleagues, the overarching goal of our ASTRO meeting is to advance precision cancer therapy. Lastly, our Annual Meeting is the culmination of more than a year's worth of planning on the part of many ASTRO staff and members. My sincere thanks to all involved in what appears will be an extraordinary meeting.

Dr. Kachnic is chair of the department of radiation oncology at Boston Medical Center and professor of radiation oncology at Boston University School of Medicine. She welcomes comments on her editorial, as well as suggestions for future ASTROnews topics, at astronews@astro.org.



Top: The San Francisco Giants have a home game against the Los Angeles Dodgers on September 14. **Right:** The Ferry Building boasts variety of restaurants and shops.





NO MATTER WHAT THE QUESTION, “QUALITY” IS THE ANSWER

IN THESE CHALLENGING TIMES of fiscal constraint on health care spending, it behooves us as radiation oncology professionals to prove the value of our specialty. Proving value unquestionably requires controlling costs; just as importantly, it requires increasing quality.

Quality has been a focus of ASTRO activities for several years, and we now have a robust pallet of four quality initiatives to discuss in detail. It is important that I relay to you that each of these has been presented to leaders at CMS (the Centers for Medicaid and Medicare Services) with resultant praise for our efforts.

Beginning with the *Choosing Wisely*® campaign presented at last year's Annual Meeting, we clearly pushed the quality issue forward. An initiative of the ABIM Foundation, we looked at increasing value and decreasing waste, identifying five radiation oncology-specific treatments that are commonly ordered but may not always be appropriate. These are:

1. Don't initiate whole breast radiation therapy as part of breast conservation in women >50 years of age with early stage invasive breast

cancer without considering shorter treatment schedules.

2. Don't initiate management of low-risk prostate cancer without discussing active surveillance.
3. Don't routinely use extended fractionation schemes (>10 fractions) for palliation of bone metastasis.
4. Don't routinely recommend proton beam therapy for prostate cancer outside of a prospective clinical trial or registry.
5. Don't routinely use intensity modulated radiation therapy (IMRT) to deliver whole breast radiation therapy as part of breast conservation therapy.

An additional set of five more recommendations will be unveiled at this year's ASTRO Annual Meeting in San Francisco. This second list has been vetted by you, our ASTRO members (thanks for that input), and will add to this important quality initiative that focuses squarely on reducing wasteful spending.

Next on our quality agenda is our new patient safety initiative, RO-ILS: Radiation Oncology Incident Learning System™. I wrote about this initiative earlier this year. As a reminder, this project was born out of the Patient Safety and Quality Improvement Act of 2005. In this law, the federal government recognized the need to collect patient safety data in a protected space and authorized the formation of PSOs (patient safety organizations). By using

Equally, if not more importantly, we can show our “quality” work to the payers who are demanding this type of effort.

a PSO, data can be transferred to this space/repository, making it privileged and confidential. It will allow all of us as providers to participate in the sharing of sensitive patient safety activities without the fear of liability.

The Agency for Health Care Research and Quality oversees the PSO program nationally. ASTRO has contracted with Clarity PSO and has developed RO-ILS so that any provider can participate. It is generally protected from liability and allows us to share this sensitive information with one another so that we can all learn from each other's errors and near-misses. You, of course, always have access to your own data and can learn from others through reports and other educational material. RO-ILS is now available and is fully qualified for Maintenance of Certification for physicians and physicists.

The new ASTRO Practice Accreditation Program:



For more information visit
www.astro.org/apex.

While we don't have all of the answers to the quality and cost questions for our radiation oncology patients, clearly we will have many more answers as we continue to develop these important quality initiatives.

ASTRO's third initiative is a practice accreditation program, APEX: Accreditation Program for Excellence. The mission is to recognize high-quality facilities by objectively assessing the radiation oncology care team, policies and procedures, and the facility. The standards for the accreditation process reflect competencies and practices identified and endorsed in the ASTRO publication *Safety is No Accident: A Framework for Quality Radiation Oncology and Care*.

The goal of the accreditation process is to be objective and transparent, and several items are included in the process to help accomplish this. The first is a set of tools to help practices navigate the accreditation process. Next is a self-assessment module to help practices determine readiness for a facility visit. Finally, a four-year cycle of accreditation was selected to allow practices time to implement and measure quality improvement strategies. Currently, APEX is accepting surveyor applications (surveyor training is robust), and we will announce when facility applications will be accepted during the ASTRO Annual Meeting in San Francisco this September.

Our fourth and final initiative is the National Radiation Oncology Registry (NROR). This initiative was born out of a research needs assessment performed by ROI shortly after its start as a foundation to support research in

radiation oncology. The goal of the registry is to elucidate national patterns of care in radiation oncology, which will provide benchmark data for comparative effectiveness. A pilot to launch the registry is opening this month in prostate cancer. Approximately 25 sites – large and small, academic and private practice – will participate in the prostate pilot with the hopes of expanding to the entire ASTRO community in 2015 and also to other disease sites. Clearly “big data,” which the registry could provide, will help to further establish the role of radiation therapy, especially where we have a paucity of data from randomized trials.

Given all of the ASTRO quality initiatives outlined above, it should be very clear to all of us as ASTRO members that we are working diligently in this area. Equally, if not more importantly, we can show our “quality” work to the payers who are demanding this type of effort. While we don't have all of the answers to the quality and cost questions for our radiation oncology patients, clearly we will have many more answers as we continue to develop these important quality initiatives.

Dr. Lawton is professor, program director and vice-chair of radiation oncology at the Medical College of Wisconsin in Milwaukee. She welcomes comments on her editorial at astronews@astro.org.

CHOOSE TO LEAD



TODAY'S RADIATION ONCOLOGY PROFESSIONALS are practicing in increasingly complex environments. Much of the complexity can be attributed to the numerous relationships that are now essential for success. The need for greater collaboration with other providers, effective navigation of emerging accountable care organizations and the ability to shape reimbursement policy are just a few examples of the leadership challenges facing the field. Add to that increasing budgetary pressures, day-to-day staff management challenges and practice growth concerns, and the need for leadership skills becomes even more apparent.

While the need to lead is strong, many in the profession have not had the opportunity to formally develop practical, behavior-based leadership capabilities. Throughout radiation oncology, leadership is often viewed as synonymous with positional authority. Chairs, department heads, administrators and doctors are considered leaders, while everyone else is expected to follow along.

While those in senior roles certainly have considerable responsibility, the profession will be best served when

all levels of contributors understand what it takes to lead by influencing outcomes and inspiring others. Radiation oncology professionals have spent years developing their technical skills. By spending just a fraction of that time developing leadership skills, they'll be better able to leverage their extensive knowledge for greater, more scalable impact to the profession and medicine as a whole.

In early 2014, ASTRO debuted the Disciplines of Leadership course. This day-and-a-half immersive leadership workshop was created specifically for the field. Designed to accelerate leadership learning and enhance participants' self-awareness, the course provides practical insights on the behaviors necessary to lead with or without formal authority. Pilot course participants included physicians, physicists, scientists and staff, all with varying years of experience. That diversity ensured an engaging experience.

"One practical lesson in the course is how to recognize your own personality type and the personality types of others. You also learn how to interact better with others based on their personalities," said course participant Richard Wilder, MD, MBA, MS, interim chair of the department of radiation oncology at Moffitt Cancer Center in Tampa, Florida.

For many who have chosen to expand their leadership capabilities, it's about embracing responsibility.

"Radiation oncologists are by default leaders in their 'team.' They

Courtney Lynch, a nationally recognized leadership expert and co-founder of Lead Star, will present during two sessions at ASTRO's 56th Annual Meeting in San Francisco. On Monday, September 15, she will be the guest speaker during ARRO's Meet the Professor Breakfast. Also on Monday, she will speak at the American Association for Women Radiologists/ASTRO luncheon. Tickets are required for the breakfast and the luncheon. Visit www.astro.org/annualmeeting for more information.

have physicists, therapists, dosimetrists, nurses and clinical assistants working with them to treat oncology patients. Even though radiation oncologists are the default 'leaders,' we receive no training or information on how to navigate this role effectively. Without a skill set, we may lead an ineffective team and subsequently have increased patient errors, decreased quality, increased frustration and an overall decrease in team morale," said course participant Mike Herman, MD, chief resident in the department of radiation oncology at the University of Florida in Gainesville, Florida.

Better leaders bring better results to the organizations of which they are a part. Disciplines of Leadership explores the fundamental behaviors that contribute to leaders' success. A few aspects of leadership that the course explores include:

- **The difference between management and leadership.** You manage things; you lead people.

Demonstrating a sense of service by understanding and meeting the needs of others allows you to build influence while minimizing the likelihood of alienating micro-management.

- **Strategies for connecting individual actions to the bigger picture of patient outcomes and organizational priorities.** Effective leaders are consistently focused on highest, best use of their time.
- **The importance of individual leader accountability.** By overriding natural instincts to place blame, leaders cultivate credibility in times of challenge and change.
- **Embracing and resolving conflict in productive ways.** Innovation and change inherently create friction. Leaders work through conflict to elevate organizational performance.
- **Key best practices for coaching and mentoring.** Active succession planning is key to building legacy as a leader.

"As a senior resident I would highly recommend the leadership course. It was a high-yield and unique experience. You learn a lot about yourself and our field. It was a great opportunity for me to listen to the challenges posed by established radiation oncologists and reflect on how I can be a successful team leader when I graduate. It also provided me a skill set to aid me in my role as chief resident to work with the other residents, support staff and faculty," Dr. Herman said.

Leadership does not begin with a title. It begins with a choice to learn how leaders influence outcomes and inspire others. ASTRO will hold the next Disciplines of Leadership course on October 15-16, 2014, in Miami.

Courtney Lynch is a nationally recognized leadership expert, founder of Lead Star and co-author of Leading from the Front, a best-selling book based on her experiences as a Marine Corps officer.

VISIT THE ASTRO RESOURCE CENTER

Located in the North Lower Lobby, outside Hall D, with extended hours for 2014:

- Learn more about APEX, ASTRO's new practice accreditation program.
- Ask about RO-ILS: Radiation Oncology Incident Learning System – the only medical specialty society-sponsored radiation oncology incident learning system.
- Have your photo taken for your ROhub profile in the ASTRO member directory.
- Pick-up ASTRO's new *Choosing Wisely* list of "Five Things Physicians and Patients Should Question."
- Meet the Survivor Circle Award winner and the Survivor Circle Grant winners.
- Get information on the 2014 specialty meetings and webinars.

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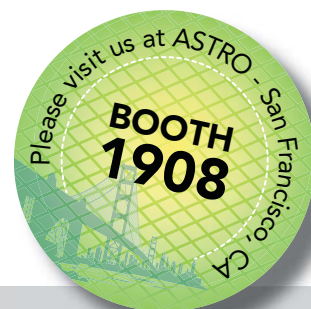


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International Day of Medical Physics highlights role of medical physicists


BY BRITTANY ASHCROFT, COMMUNICATIONS MANAGER, BRITTANYA@ASTRO.ORG

The International Organization of Medical Physics (IOMP) will celebrate its second annual International Day of Medical Physics on November 7, 2014. IOMP organized the first International Day of Medical Physics last year as a way to raise awareness of the important role medical physicists have in patient care.

IOMP selected November 7 because of its significance in the history of medical physics as Madame Marie Sklodowska-Curie, known for her seminal research in radioactivity, was born in Poland on November 7, 1867.



The theme of this year's International Day of Medical Physics is "Looking into the Body: Advancement in Imaging through Medical Physics." The goal of this year's event is to highlight the numerous contributions medical physics has made to imaging of the human body, an important step in preventing and managing illnesses.

For more information about activities planned in the United States and internationally to mark this year's event, visit www.iomp.org/idmp. 

ASTRO develops second list for national *Choosing Wisely* campaign

BY BRITTANY ASHCROFT, COMMUNICATIONS MANAGER, BRITTANYA@ASTRO.ORG

ASTRO is proud to be a part of the national *Choosing Wisely*® campaign, an initiative of the ABIM Foundation to promote "conversations between providers and patients to ensure the right care is delivered at the right time." Participating organizations use evidence-based recommendations to develop lists of treatments that providers and patients should discuss to help make informed decisions about appropriate care based on a patient's individual situation.


As part of this campaign, ASTRO developed an initial list in 2013 of five radiation oncology-specific treatments that are commonly ordered but may not always be appropriate. This list of "Five Things Physicians and Patients Should Question" was released during ASTRO's 55th Annual Meeting in Atlanta. The list is available at



An initiative of the ABIM Foundation

www.astro.org/choosingwiselylist.

In addition to the list of five treatments, ASTRO partnered with *Consumer Reports* to produce an informational flyer for low-risk prostate cancer patients. The *Consumer Reports* patient flyer is available, free of charge, at www.astro.org/ChoosingWisely.

In line with ASTRO's continued commitment to helping patients receive appropriate care, the Society is currently developing a second list of "Five Things Physicians and Patients Should Question." This second list of evidence-based recommendations will be released at ASTRO's 56th Annual Meeting in San Francisco during Panel 03 (Sunday, September 14, 1:15 p.m. - 2:45 p.m.): Innovative Payment Models and The Future of Radiation Oncology – Impact on Quality, Payment Reform and Patient Care. 

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Important sessions and changes at ASTRO's 56th Annual Meeting

BY CRISTIN WATSON, ASSISTANT DIRECTOR OF EDUCATION, CRISTINW@ASTRO.ORG

ASTRO's 56th Annual Meeting, taking place September 14-17 at Moscone Center in San Francisco, will once again attract attendees from around the world to the premier scientific meeting for radiation oncology.

To ensure the Annual Meeting experience continues to improve for attendees, ASTRO has implemented some program changes to further enhance the meeting experience. The changes for this year's meeting include:

- Implementation of a new schedule that has educational sessions in the morning and a mix of oral scientific, poster discussion, educational and panel sessions throughout the afternoon and evening, all in concurrent time slots. Previously, educational sessions took place in the morning, with science in the afternoon and panels in the evening. The change is based on attendee and faculty feedback and allows attendees more flexibility in the sessions they can choose to attend.
- For the first time, the Clinical Trials session (Sunday, 3:15 p.m.) will run unopposed to provide all attendees the opportunity to hear the presentations of this clinically relevant science.
- Two ASTRO Guidelines Highlight sessions (Monday, 3:25 p.m. and Wednesday, 10:00 a.m.) will run unopposed so that all attendees may participate.
- A new CROPS (Community of Radiation Oncology Physician Scientists) workshop focusing on challenges and solutions for a successful physician scientist career in radiation oncology is scheduled for 4:15 p.m. on Monday.
- The Young Physicians' Workshop has been moved from

Saturday to Tuesday at 2:15 p.m. Attendees can earn up to three hours of CME.

- The International Program has been expanded to include sessions on Saturday, Sunday and Monday (see "International Program expanded to offer more sessions" on page 19).

The theme of this year's meeting is "Targeting Cancer: Technology and Biology." The three keynote speakers will address this theme by discussing about the multidisciplinary care of patients and the advances in cancer technology and biology. Hedvig Hricak, MD, PhD, chair of the Department of Radiology and Carol and Milton Petrie Chair at Memorial Sloan Kettering Cancer Center; Frank McCormick, PhD, the David A. Wood Distinguished Professor of Tumor Biology and Cancer Research at UCSF Helen Diller Family Comprehensive Cancer Center; and Sidney Dekker, PhD, professor at Griffith University in Australia and an expert in human error and safety, will deliver the keynote sessions.

In addition to the keynotes, the Presidential Symposium planned by ASTRO President Bruce G. Haffty, MD, FASTRO, will focus on "Local-regional Management of Breast Cancer: A Changing Paradigm." Jay R. Harris, MD, FASTRO, and Thomas A. Buchholz, MD, FASTRO, will moderate the symposium and highlight three major topics: local treatment of early stage breast cancer, local-regional treatment after preoperative systemic therapy and regional nodal management of breast cancer.


The educational sessions and scientific panels will cover a variety of topics, and there are several that directly relate to the theme of this year's Annual Meeting. Those sessions are (in chronological order):

- **Panel 01** – Image Guided Brachytherapy: The Integration of Imaging Technology to Enhance HDR Planning and Treatment Delivery (Sunday, 1:15 p.m.).
- **Panel 04** – Adaptive Radiation Therapy (ART): Are You Ready for Clinical Implementation? (Sunday, 4:45 p.m.).
- **Educational Session 203** – Challenging Cases and Clinical Trials for Spine Metastases and Spinal Cord Compression: A High-technology Multidisciplinary Approach (Monday, 7:45 a.m.).
- **Educational Session 204** – Radiation/Chemoradiation and Biological Targeting (Monday, 7:45 a.m.).
- **Educational Session 206** (Live SAM) – Esophagus and Gastric Cancer: Contemporary Treatment Approaches (Monday, 7:45 a.m.).



For the first time, the Clinical Trials session and two Guidelines Highlight sessions will run unopposed to allow for more attendees to participate in these important sessions.

- **Panel 07** – Quality of Life Following Radiotherapy for Prostate Cancer (Monday, 4:15 p.m.).
- **Educational Session 302** – The Basics of Genomic Radiobiology – Concepts and Clinical Applications (Tuesday, 7:45 a.m.).
- **Educational Session 303** – Stereotactic Body RT: Clinical, Biological and Physics/QA Update (Tuesday, 7:45 a.m.).
- **Educational Session 308** – Advanced Treatment of Non-small Cell Lung Cancer: Using All the Tools (Imaging, Motion Correction and IMRT) Promises and Pitfalls – A Case-based Approach (Tuesday, 7:45 a.m.).
- **Panel 09** – Cancer Stem Cell Targeting: Importance for Radiotherapy (Tuesday, 1:00 p.m.).
- **Panel 11** – Clinical Trials in Breast Cancer Radiotherapy: Current Status and Future Directions (Tuesday, 2:45 p.m.).
- **Panel 12** – Rational Combination of Metallic Nanoparticles and Radiation – Recent Advances and Future Prospects (Tuesday, 2:45 p.m.).
- **Panel 17** – Modern Technologies for Improving the Therapeutic Ratio of Radiation Therapy in Lymphoma (Wednesday, 1:15 p.m.).

All times are subject to change. These changes are the result of attendee feedback, so be sure to complete the Annual Meeting evaluation while you are at the meeting or online post-meeting. For more information or to register for the Annual Meeting, visit www.astro.org/annualmeeting. 

Top-rated abstracts presented during Plenary and Clinical Trials sessions

BY LYNN D. WILSON, MD, MPH, FASTRO, ANNUAL MEETING SCIENTIFIC COMMITTEE CHAIR, AND BENJAMIN MOVSAS, MD, FASTRO, ANNUAL MEETING SCIENTIFIC COMMITTEE VICE-CHAIR

ASTRO's 56th Annual Meeting continues the long-standing tradition of featuring cutting-edge science and research in radiation oncology. The Annual Meeting program consists of 20 scientific panels and more than 50 educational sessions, in addition to 360 oral presentations, 1,862 posters and 144 digital posters in 20 tracks.

This year, ASTRO received a record-breaking 2,874 abstracts from researchers around the world. While 58 percent (1,681) of the abstracts are from the United States, 7 percent (206) are from Japan, more than 6 percent (191) are from China, and nearly 6 percent (171) are from Canada.

The Plenary Session, which runs unopposed, currently includes highly rated studies on combining radiation therapy and immunotherapy as well as on the topic of intermediate- and high-risk localized prostate cancer. Lead author Andrew Sharabi, MD, PhD, of Johns Hopkins School of Medicine in Baltimore, will discuss the results of a study examining the potential mechanism and clinical implications of combining radiation therapy and immunotherapy in melanoma and breast carcinoma. Also in the Plenary Session, lead author Almudena Zapatero, MD, PhD, of the Hospital Universitario de la Princesa in Madrid, Spain, will present the results of a GICOR study (DART trial) evaluating long-term androgen deprivation compared to short-term androgen deprivation in intermediate- and high-risk local-

ized prostate cancer patients treated with high-dose radiation therapy.

For the first time, the popular Clinical Trials Session will run unopposed to provide all attendees the opportunity to hear presentations on this important science. The Clinical Trials Session will highlight eight studies:

- **Felix Y. Feng, MD**, of the University of Michigan in Ann Arbor, Michigan, is the lead author and will share the results of a study on prognostic biomarkers in prostate cancer.
- **Mohan Suntharalingam, MD, MBA**, of the University of Maryland School of Medicine in Baltimore, is the lead author of an initial report of local control in RTOG 0436, a randomized phase III trial examining the addition of cetuximab to paclitaxel, cisplatin and radiation for esophageal cancer patients treated with surgery.
- **Ben J. Slotman, MD, PhD**, of VU University Medical Center in Amsterdam, is the lead author of a study evaluating the patterns of disease recurrence in an international, multicenter randomized trial analyzing the role of thoracic radiation therapy in extensive stage small cell lung cancer.
- **Susan A. McCloskey, MD**, of the University of California Los Angeles, is the lead author and will discuss the results of a secondary data analysis analyzing the impact

of radiation therapy on lymphedema risk for patients in NSABP B-32, a randomized trial of sentinel node biopsy and axillary node dissection versus sentinel node biopsy in women with clinically node-negative breast cancer.

- **Michael G. Penniment, MD, MBA**, of Royal Adelaide Hospital in Adelaide, Australia, is the lead author and will share a report on Trans Tasman Radiation Oncology Group (TROG) 03.01 NCIC CTG ES.2, a multinational, phase III study comparing quality of life and palliation of dysphagia in patients with advanced esophageal cancer treated with radiotherapy or chemoradiation therapy.
- **Lawrence B. Berk, MD, PhD**, of the University of South Florida in Tampa, is the lead author and will present the results of a randomized phase II trial evaluating the efficacy of Manuka Honey liquid and Manuka Honey lozenges in preventing radiation esophagitis in patients with lung cancer treated with chemotherapy and radiation therapy.

- **Rahul R. Parikh, MD**, of Mount Sinai Beth Israel Medical Center and Mount Sinai St. Luke's-Roosevelt Hospitals in New York, is the lead author and will discuss the results of a study examining the utilization of radiation therapy and its impact on overall survival in early-stage Hodgkin's disease.
- **Mark D. Hurwitz, MD**, of the Jefferson Medical College of Thomas Jefferson University in Philadelphia, is the lead author and will share the results of RTOG 0621, a single-arm, phase II trial evaluating the addition of androgen deprivation and docetaxel to adjuvant radiation therapy for high-risk prostate cancer patients post-prostatectomy.

Late-breaking abstracts may be added to these sessions. The Plenary Session takes place on Monday, September 15 at 2:15 p.m. The Clinical Trials Session is scheduled for Sunday, September 14 at 3:15 p.m. [A](#)

Annual Meeting offers highly rated physics, biology research

BY INDRIN J. CHETTY, PHD, MS, PHYSICS TRACK CHAIR, AND FELIX Y. FENG, MD, BIOLOGY TRACK CHAIR

The theme of this year's Annual Meeting is "Targeting Cancer: Technology and Biology," and focuses on the combination of developments in basic, translational and applied technology and clinical sciences to improve quality of life and outcomes for cancer patients.

There are several opportunities during the meeting to learn about some of the top physics and biology research being conducted in the specialty. Included here is a sampling of these abstracts being presented during the Annual Meeting.

In the Radiation Physics track:

- **Jean-François Adam, PhD**, of the Grenoble Institute des Neurosciences, Université Joseph Fourier and the Centre Hospitalier Universitaire de Grenoble in Grenoble, France, is the lead author and will discuss a study examining current contrast-enhanced synchrotron stereotactic radiation therapy clinical trials from a medical physicist's perspective (Scientific Session D: Physics – SRS and SBRT, Sunday, 4:45 p.m.).
- **Jeremy Booth, PhD**, of the Northern Sydney Cancer Centre in Sydney, is the lead author and will present the results of a study evaluating the first clinical implications

of electromagnetic transponder-guided multileaf collimator tracking (Scientific Session F: Best of Physics, Monday, 10:45 a.m.).


- **Sasa Mutic, PhD**, of the Washington University School of Medicine in St. Louis, is the lead author and will share the results of a study reporting on the initial experiences and future clinical implications of magnetic resonance image guided radiation therapy (Scientific Session Z: Physics – MRI Guided Radiation Therapy, Tuesday, 4:45 p.m.).
- **Barbara Vanderstraeten, PhD**, of Ghent University Hospital and Ghent University in Gent, Belgium, is the lead author of a study analyzing the costs associated with adaptive intensity modulated radiation therapy for head and neck cancer (Scientific Session CC: Physics – Automation and Adaptive Planning, Wednesday, 10:45 a.m.).
- **Yana Zlateva, MS**, of McGill University Health Centre in Montreal, is the lead author and will present a study examining the implementation of Cerenkov emission for image guidance and intensity modulated radiation therapy (Digital Poster Discussion 09: Physics – Emerging and Novel Physics Indications, Tuesday, 2:45 p.m.).

In the Radiation and Cancer Biology track:

- **Corey Speers, MD, PhD**, of the University of Michigan Hospital in Ann Arbor, Michigan, is the lead author and will discuss a study analyzing maternal embryonic leucine zipper kinase as a target for radiosensitization in triple-negative breast cancers (Scientific Session I: Biology – Radiosensitizers, Monday, 10:45 a.m.).
- **David G. Kirsch, MD, PhD**, of Duke University in Durham, North Carolina, is the lead author and will present the results of a study on the use of mouse genetics to examine the radiobiology of stereotactic body radiation therapy and whether tumor cells or endothelial cells regulate local control (Scientific Session O: Biology – Immunotherapy and the Microenvironment, Monday, 4:15 p.m.).
- **Kent Mouw, MD, PhD**, of the Harvard Radiation Oncol-

ogy Program in Boston, is the lead author of a study to identify and validate genetic predictors of cisplatin response in muscle-invasive urothelial carcinoma (Scientific Session X: Biology – Biomarkers and Imaging, Tuesday, 2:45 p.m.).

- **Jason W. Hearn, MD**, of the Cleveland Clinic in Cleveland, is the lead author and will share the results of a study to identify genetic determinants of radioresistance in non-small cell lung cancer using cancer genomic data (Scientific Session BB: Biology – Molecular Biology of Lung Cancer, Tuesday, 4:45 p.m.).


All times are subject to change. For more information or to register for the Annual Meeting, visit www.astro.org/annualmeeting. 

Learn about new ASTRO services, membership benefits at the ASTRO Resource Center

The ASTRO Resource Center is located in the North Lower Lobby of Moscone Center at ASTRO's 56th Annual Meeting, a change from its usual location in the Exhibit Hall. Along with its new site, the Resource Center will be open expanded hours, beginning Saturday, September 13 through Wednesday, September 17. Meeting attendees can learn about all of the products and services available to ASTRO members. If you are not yet a member, ASTRO staff will be on hand to help you apply for membership online, and those who join on-site will receive a special gift. Information will be available on ASTRO's new programs, including APEX: Accreditation Program for Excellence. APEX began accepting surveyor applications in March of this year, and the facility application site opening date will be announced at the Annual Meeting.

Other featured products this year include RO-ILS: Radiation Oncology Incident Learning System. Launched in June of this year, RO-ILS is co-sponsored by the American Association of Physicists in Medicine (AAPM). It is the only medical specialty society-sponsored radiation oncology incident learning system. You'll also have the opportunity to review updated patient brochures, browse the patient website, RTAnswers.org, and get information on ASTRO's 2015 specialty meetings. A professional photographer will be in the booth during designated hours, and you will have the chance to get your picture taken for ROhub, ASTRO's exclusive online community and member directory. You'll be able to select the photo you like and upload it to the online member directory when you update

your profile. ASTRO staff will also be asking for your feedback and suggestions for improvements to the ASTRO website, ASTRO.org, as preparations are underway for a redesign in 2015.

The Survivor Circle is located in the ASTRO Resource Center again this year. Established in 2003, the Survivor Circle was created to honor cancer survivors in the Annual Meeting host city. Each year, ASTRO partners with two local patient support organizations that are featured in the Survivor Circle. Through generous donations from exhibitors, the groups also receive grants of up to \$10,000. The 2014 Survivor Circle Grant recipients are the Breast and Gyn Health Project and Kids Connected. 



The ASTRO Resource Center offers information on various ASTRO products and membership benefits, and ASTRO staff on-site can help attendees apply for ASTRO membership.

Learn more about RO-ILS at ASTRO's Annual Meeting

BY CHRISTIAN SPRANG, QUALITY IMPROVEMENT ANALYST, CHRISTIANS@ASTRO.ORG

RO-ILS: Radiation Oncology Incident Learning System™ represents a key commitment of *Target Safely*, ASTRO's patient protection plan, which is designed to improve the safety and quality of radiation oncology. RO-ILS provides shared learning in a secure and non-punitive environment by offering shelter from legal liability and professional sanctions to U.S.-based practices for collection and analysis of patient safety events, as outlined in the Patient Safety and Quality Improvement Act of 2005. ASTRO contracted with Clarity Group Inc. and Clarity PSO, a division of Clarity Group Inc., to develop and administer RO-ILS. Clarity PSO is a federally qualified patient safety organization (PSO).

RO-ILS was developed with the support and partnership of the American Association of Physicists in Medicine and is the only medical specialty society-sponsored incident learning system for radiation oncology.


Attendees can learn more about RO-ILS and PSOs during ASTRO's 56th Annual Meeting in San Francisco at several of sessions and events, including:

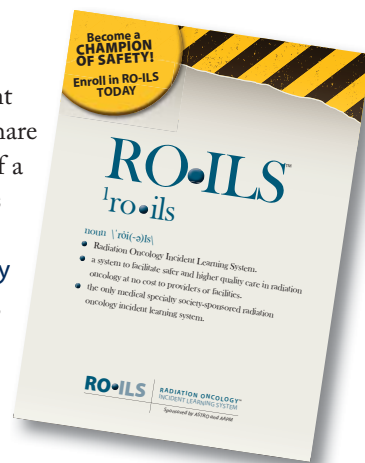
- **Patient Safety Luncheon: Lessons Learned from Medical Specialty Patient Safety Organizations** – Sunday, September 14, 12:15 p.m.
Experts from the Pediatric Anesthesiology Quality Improvement Initiative (Wake Up Safe) and the Society

for Vascular Surgery Patient Safety Organization will share how the implementation of a PSO made their specialties safer and more effective.

- **Keynote Address III: Sidney Dekker, PhD** – Wednesday, September 17, 9:15 a.m.
Dr. Dekker will give a keynote address discussing safety culture and the notion of “just culture.”
- **Educational Session 412: Improving Patient Safety and Quality of Care with the Radiation Oncology Incident Learning System (RO-ILS)** – Wednesday, September 17, 10:45 a.m.

This educational session will describe the program, its structure and operation, and share experiences from early users.

Registration is required for the Patient Safety Luncheon. To register, visit www.astro.org/annualmeeting. For more information on RO-ILS, visit www.astro.org/ROILS or email ROILS@astro.org. 




Spotlight on ASTRO's Clinical Practice Guidelines

There will be two sessions on ASTRO's guidelines at this year's Annual Meeting. These guidelines serve as a convenient evidence-based practice resource. Both of these sessions run unopposed so that all attendees may participate. More information about ASTRO's guidelines is available at www.astro.org/guidelines.

On Monday, September 15, Meena S. Moran, MD, of the Yale School of Medicine, and Monica Morrow, MD, of Memorial Sloan Kettering Cancer Center, will discuss the *SSO-ASTRO Consensus Guideline on Margins for Breast-Conserving Surgery with Whole Breast Irradiation in Stage I and II Invasive Breast Cancer*. The Society of Surgical Oncology (SSO) and ASTRO convened a multidisciplinary expert panel in 2013 for the purpose of examining the relationship

between margin width and local recurrence. The session takes place at 3:25 p.m. in the Esplanade Ballroom, immediately following the Plenary Session.

On Wednesday, September 17, Benjamin D. Smith, MD, and Ann H. Klopp, MD, PhD, both of MD Anderson Cancer Center, and George Rodrigues, MD, PhD, of the London Health Sciences Centre, will discuss guidelines on endometrial cancer and lung cancer. ASTRO recently completed guidelines on *The Role of Post-operative Radiation Therapy for Endometrial Cancer* and *The Role of Radiotherapy in Locally Advanced Non-small Cell Lung Cancer*. Learn about the key questions addressed by these guidelines. This session takes place at 10:00 a.m. in the Esplanade Ballroom, directly after the keynote address from Sidney Dekker, PhD. 

Learn more about APEx during the Annual Meeting

BY ANGELA NICHOLAS, SENIOR MANAGER, ACCREDITATION PROGRAM FOR EXCELLENCE (APEX), ANGELAN@ASTRO.ORG


ASTRO's practice accreditation program highlights the Society's commitment to safety and quality. The program uses evidence-based guidelines and consensus statements on the practice of radiation oncology to establish standards of performance. ASTRO's practice accreditation program will provide an objective review of essential functions and processes of radiation oncology practices by practicing radiation oncology professionals, in addition to an on-site visit from a multidisciplinary team.

The practice accreditation program consists of five key areas: the process of care, the radiation oncology team, safety, quality management and patient-centered care.

There are several opportunities to learn more about ASTRO's practice accreditation program during ASTRO's 56th Annual Meeting in San Francisco. On Saturday, September 13, there will be a surveyor orientation session for surveyors who have submitted an application and have been approved to be a surveyor. This interactive session will pro-

vide guidance on the surveyor's role and allow time for surveyors to access the online orientation.

On Monday, September 15, the practice accreditation luncheon will provide an overview of APEx, along with the necessary information needed to understand the process, from application to successful accreditation. Attendees will learn more about the expectation, steps, resources and tools to complete the APEx process.

Additionally, staff will be in the ASTRO Resource Center (North Lower Lobby, outside Hall D) to answer questions about the program. Tickets are required for the training and luncheon at the Annual Meeting. To purchase tickets, visit www.astro.org/annualmeeting. For more information on the practice accreditation program, visit www.astro.org/APEx. 



International Program expanded to offer more sessions

BY BRITTANY ASHCROFT, COMMUNICATIONS MANAGER, BRITTANYA@ASTRO.ORG

ASTRO continues to expand the international offerings during the Annual Meeting to better serve those attendees.

This year, the International Program has been expanded to offer sessions on Saturday, Sunday and Monday.

Two foreign language refresher courses are scheduled on Saturday afternoon, September 13. A Chinese language refresher course will focus on a multidisciplinary approach to improve quality and safety in radiation therapy. Following that session, a Spanish language refresher course will focus on an update and review of established and modern technologies.

The popular International Attendees Welcome Breakfast takes place on Sunday, September 14, and the International – U.S. Annual Meeting Scientific Abstract Award will be presented during the breakfast. Attendees must have an international attendee badge holder (black) to be admitted to the breakfast.

On Sunday, two additional internationally focused sessions include the “Best of ESTRO at ASTRO,” moderated by ESTRO President Philip Poortmans, MD, and ASTRO President Bruce G. Haffty, MD, FASTRO; and a panel from the Union for International Cancer Control (UICC).

Continued on Page 20

W. Ken Zhen, MD, leads the Chinese Poster Walk during ASTRO's 55th Annual Meeting in Atlanta.



Continued from Page 19

The UICC has formed a global task force to highlight the need for radiation therapy in low- and middle-income countries that are faced with a rapidly rising incidence of cancer. The panel will discuss the epidemiologic plight, the investments required and how to tailor to a country's needs, as well as the role of advocacy at the governmental and grassroots levels. The task force represents a coordinated effort among major cancer and radiation societies including ASTRO, ESTRO, the International Atomic Energy Agency and the World Health Organization. Anyone involved or interested in global health will find this session helpful and informative.

On Monday, September 15, ASTRO and ESTRO will present a joint breast symposium on the current challenges in radiation therapy for breast cancer.

The annual International Symposium is also scheduled for Monday with two sessions focusing on the safe imple-

mentation of advanced technologies in radiation oncology. The first session will include discussion about the clinical implementation of intensity modulated radiation therapy, image guided radiation therapy and image guided adaptive radiation therapy. The second part of the symposium will focus on the commissioning and clinical implementation of stereotactic body radiation therapy and stereotactic radiosurgery systems.

Also taking place on Monday are the two foreign language poster walks. A separate ticket is required for the walks, and lunch will be provided to ticketed attendees. Poster walks will be conducted in Chinese for head and neck abstracts and in Spanish for breast, central nervous system and prostate abstracts.

To register for the Annual Meeting and these special international events, visit www.astro.org/annualmeeting. 

ARRO Annual Seminar and Meet the Professor event provide resident-specific sessions

BY SETH MILLER, MD, ARRO EDUCATION OFFICER, BRANDON MANCINI, MD, ARRO CHAIR, AND AMANDA WALKER, MD, ARRO VICE-CHAIR

The Association of Residents in Radiation Oncology (ARRO) Executive Committee is excited about the upcoming events at the ASTRO Annual Meeting in San Francisco. The ARRO Executive Committee has worked hard to develop a program that will enrich the resident experience, while providing valuable information that can be utilized during residency and beyond.



The ARRO Annual Seminar offers a variety of sessions tailored specifically to residents.

The ARRO Annual Seminar takes place on Saturday, September 13, from 10:00 a.m. to 4:30 p.m. The morning will begin with presentations from our Global Health Scholars, who will share their experiences abroad and share their perspectives on how radiation therapy and cancer care are delivered internationally.

Then, Bhisham Chera, MD, assistant professor and director of patient safety and quality at the University of North Carolina in Chapel Hill, North Carolina, will discuss "Radiation Oncologist Engagement in Quality and Safety in Leadership." This will be followed by a keynote address from Stephen Hahn, MD, FASTRO, chair of the Department of Radiation Oncology at the University of Pennsylvania in Philadelphia.

The jobs panel has always been a highlight of the ARRO Annual Seminar. This year, Lisa Kachnic, MD, chair of the Department of Radiation Oncology at Boston Medical Center in Boston, will moderate, and this session has been extended to 90 minutes in hopes of answering more of the pressing questions trainees face as they seek employment after residency.

The panel includes an excellent group of early-career physicians, including:

- Aaron Spalding, MD, PhD, a pediatric radiation oncologist at Norton Cancer Institute in Louisville, Kentucky.
- Marka Crittenden, MD, PhD, a physician scientist at Providence Portland Cancer Center in Portland, Oregon.
- Siavash Jabbari, MD, a radiation oncologist at Scripps Health in Chula Vista, California.
- Gautum Prasad, MD, PhD, a radiation oncologist at Epic Care in Dublin, California.

The jobs panel will be followed by a session from ARRO's ongoing educational series (posted at www.astro.org/ARRO), led by Charles Thomas Jr., MD, of Oregon Health and Science University in Portland, Oregon. His presentation is titled "Career Development: Strategy Primer to Address Young Investigator Skill Set Gaps for Clinical Research." He will discuss opportunities for additional clinical research training, such as the AACR Methods in Clinical Cancer Research Conference in Vail, Colorado, as well as involvement in collaborative groups like NRG Oncology. Finally, Terry Wall, MD, JD, FASTRO, will lead the ever-popular Practice Entry Survey Results session.

Following the ARRO Annual Seminar, residents are

invited to celebrate your time in San Francisco and catch up with fellow residents from across the country at the ARRO reception on Saturday from 6:30 p.m. to 8:30 p.m. at Slide, located at 430 Mason Street in downtown San Francisco.

Another exciting change to the ARRO program involves the Meet the Professor event. Historically, this has been a roundtable discussion that takes place over lunch on Wednesday. This year it will be held as a breakfast event on Monday, September 15, from 7:15 a.m. to 9:00 a.m. A panel of speakers will discuss leadership as it applies to residents in radiation oncology. Faculty participants include Ted DeWeese, MD, Tim R. Williams, MD, FASTRO, Andrew Turrisi, MD, and Courtney Lynch, a leadership expert and facilitator of the ASTRO Disciplines of Leadership Course.

Also, don't forget about the ARRO Medical Student Meet and Greet. Held during the poster reception on Monday, September 15 from 5:30 p.m. to 6:45 p.m., the meet and greet allows residents to connect with medical students interested in radiation oncology. Program directors are also invited to attend. Spread the word to your fellow residents, your program director and any medical students in attendance.

We are incredibly excited for the ASTRO Annual Meeting and look forward to an outstanding program of ARRO events. 

Passport Program

(AS OF JULY 11, 2014)

***A special thank you to our Survivor Circle Passport Program Participants.
Through their generous donations, the Breast and Gyn Health Project and Kids Connected
received grants to help support their initiatives helping California cancer survivors.***



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XOFIGO® IS INDICATED

for the treatment of patients with castration-resistant prostate cancer (CRPC), symptomatic bone metastases and no known visceral metastatic disease.¹

X Bone metastases?¹

X First sign of symptoms?¹

Start **X**ofigo to extend survival^{1,2}

Important Safety Information

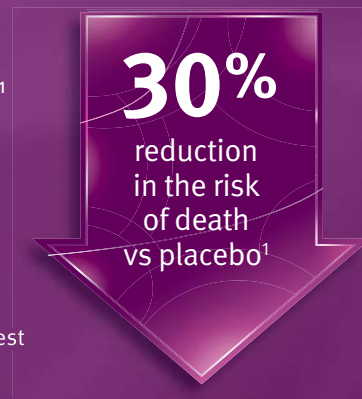
- **Contraindications:** Xofigo is contraindicated in women who are or may become pregnant. Xofigo can cause fetal harm when administered to a pregnant woman
- **Bone Marrow Suppression:** In the randomized trial, 2% of patients in the Xofigo arm experienced bone marrow failure or ongoing pancytopenia, compared to no patients treated with placebo. There were two deaths due to bone marrow failure. For 7 of 13 patients treated with Xofigo bone marrow failure was ongoing at the time of death. Among the 13 patients who experienced bone marrow failure, 54% required blood transfusions. Four percent (4%) of patients in the Xofigo arm and 2% in the placebo arm permanently discontinued therapy due to bone marrow suppression. In the randomized trial, deaths related to vascular hemorrhage in association with myelosuppression were observed in 1% of Xofigo-treated patients compared to 0.3% of patients treated with placebo. The incidence of infection-related deaths (2%), serious infections (10%), and febrile neutropenia (<1%) was similar for patients treated with Xofigo and placebo.
- **Myelosuppression**—notably thrombocytopenia, neutropenia, pancytopenia, and leukopenia—has been reported in patients treated with Xofigo. Monitor patients with evidence of compromised bone marrow reserve closely and provide supportive care measures when clinically indicated. Discontinue Xofigo in patients who experience life-threatening complications despite supportive care for bone marrow failure
- **Hematological Evaluation:** Monitor blood counts at baseline and prior to every dose of Xofigo. Prior to first administering Xofigo, the absolute neutrophil count (ANC) should be $\geq 1.5 \times 10^9/L$, the platelet count $\geq 100 \times 10^9/L$, and hemoglobin ≥ 10 g/dL. Prior to subsequent administrations, the ANC should be $\geq 1 \times 10^9/L$ and the platelet count $\geq 50 \times 10^9/L$. Discontinue Xofigo if hematologic values do not recover within 6 to 8 weeks after the last administration despite receiving supportive care
- **Concomitant Use With Chemotherapy:** Safety and efficacy of concomitant chemotherapy with Xofigo have not been established. Outside of a



- In the ALSYMPCA^a *exploratory updated analysis*,^b median overall survival was 14.9 months for Xofigo (95% confidence interval [CI]: 13.9-16.1) vs 11.3 months for placebo (95% CI: 10.4-12.8) [hazard ratio (HR)=0.695; 95% CI: 0.581-0.832]¹
- In the ALSYMPCA *prespecified interim analysis*, median overall survival was 14.0 months for Xofigo (95% CI: 12.1-15.8) vs 11.2 months for placebo (95% CI: 9.0-13.2) [$P=0.00185$ (HR=0.695; 95% CI: 0.552-0.875)]¹

^aALSYMPCA was a phase 3 randomized, double-blind, controlled trial that evaluated Xofigo plus best standard of care (n=614) vs placebo plus best standard of care (n=307).¹

^bAn exploratory updated overall survival analysis was performed before patient crossover, incorporating an additional 214 events, resulting in findings consistent with the interim analysis.¹



Visit us at Booth 1818 or www.xofigo-us.com

clinical trial, concomitant use of Xofigo in patients on chemotherapy is not recommended due to the potential for additive myelosuppression. If chemotherapy, other systemic radioisotopes, or hemibody external radiotherapy are administered during the treatment period, Xofigo should be discontinued

- **Administration and Radiation Protection:** Xofigo should be received, used, and administered only by authorized persons in designated clinical settings. The administration of Xofigo is associated with potential risks to other persons from radiation or contamination from spills of bodily fluids such as urine, feces, or vomit. Therefore, radiation protection precautions must be taken in accordance with national and local regulations
- **Adverse Reactions:** The most common adverse reactions ($\geq 10\%$) in the Xofigo arm vs the placebo arm, respectively, were nausea (36% vs 35%), diarrhea (25% vs 15%), vomiting (19% vs 14%), and peripheral edema (13% vs 10%). Grade 3 and 4 adverse events were reported in 57% of Xofigo-treated patients and 63% of placebo-

treated patients. The most common hematologic laboratory abnormalities in the Xofigo arm ($\geq 10\%$) vs the placebo arm, respectively, were anemia (93% vs 88%), lymphocytopenia (72% vs 53%), leukopenia (35% vs 10%), thrombocytopenia (31% vs 22%), and neutropenia (18% vs 5%)

References: 1. Xofigo® (radium Ra 223 dichloride) injection [prescribing information]. Wayne, NJ: Bayer HealthCare Pharmaceuticals Inc.; May 2013. 2. Parker C, Nilsson S, Heinrich D, et al. Alpha emitter radium-223 and survival in metastatic prostate cancer. *N Engl J Med*. 2013;369(3):213-223.

Please see brief summary of full Prescribing Information on following pages.

 **Xofigo**[®]
radium Ra 223 dichloride
INJECTION

Xofigo (radium Ra 223 dichloride) Injection, for intravenous use

Initial U.S. Approval: 2013

BRIEF SUMMARY OF PRESCRIBING INFORMATION

CONSULT PACKAGE INSERT FOR FULL PRESCRIBING INFORMATION

1 INDICATIONS AND USAGE

Xofigo™ is indicated for the treatment of patients with castration-resistant prostate cancer, symptomatic bone metastases and no known visceral metastatic disease.

2 DOSAGE AND ADMINISTRATION

2.3 Instructions for Use/Handling

General warning

Xofigo (an alpha particle-emitting pharmaceutical) should be received, used and administered only by authorized persons in designated clinical settings. The receipt, storage, use, transfer and disposal of Xofigo are subject to the regulations and/or appropriate licenses of the competent official organization.

Xofigo should be handled by the user in a manner which satisfies both radiation safety and pharmaceutical quality requirements. Appropriate aseptic precautions should be taken.

Radiation protection

The administration of Xofigo is associated with potential risks to other persons (e.g., medical staff, caregivers and patient's household members) from radiation or contamination from spills of bodily fluids such as urine, feces, or vomit. Therefore, radiation protection precautions must be taken in accordance with national and local regulations.

For drug handling

Follow the normal working procedures for the handling of radiopharmaceuticals and use universal precautions for handling and administration such as gloves and barrier gowns when handling blood and bodily fluids to avoid contamination. In case of contact with skin or eyes, the affected area should be flushed immediately with water. In the event of spillage of Xofigo, the local radiation safety officer should be contacted immediately to initiate the necessary measurements and required procedures to decontaminate the area. A complexing agent such as 0.01 M ethylene-diamine-tetraacetic acid (EDTA) solution is recommended to remove contamination.

For patient care

Whenever possible, patients should use a toilet and the toilet should be flushed several times after each use. When handling bodily fluids, simply wearing gloves and hand washing will protect caregivers. Clothing soiled with Xofigo or patient fecal matter or urine should be washed promptly and separately from other clothing. Radium-223 is primarily an alpha emitter, with a 95.3% fraction of energy emitted as alpha-particles. The fraction emitted as beta-particles is 3.6%, and the fraction emitted as gamma-radiation is 1.1%. The external radiation exposure associated with handling of patient doses is expected to be low, because the typical treatment activity will be below 8,000 kBq (216 microcurie). In keeping with the **As Low As Reasonably Achievable (ALARA)** principle for minimization of radiation exposure, it is recommended to minimize the time spent in radiation areas, to maximize the distance to radiation sources, and to use adequate shielding. Any unused product or materials used in connection with the preparation or administration are to be treated as radioactive waste and should be disposed of in accordance with local regulations.

The gamma radiation associated with the decay of radium-223 and its daughters allows for the radioactivity measurement of Xofigo and the detection of contamination with standard instruments.

4 CONTRAINDICATIONS

Xofigo is contraindicated in pregnancy.

Xofigo can cause fetal harm when administered to a pregnant woman based on its mechanism of action. Xofigo is not indicated for use in women. Xofigo is contraindicated in women who are or may become pregnant. If this drug is used during pregnancy, or if the patient becomes pregnant while taking this drug, apprise the patient of the potential hazard to the fetus [see *Use in Specific Populations* (8.1)].

5 WARNINGS AND PRECAUTIONS

5.1 Bone Marrow Suppression

In the randomized trial, 2% of patients on the Xofigo arm experienced bone marrow failure or ongoing pancytopenia compared to no patients treated with placebo. There were two deaths due to bone marrow failure and for 7 of 13 patients treated with Xofigo, bone marrow failure was ongoing at the time of death. Among the 13 patients who experienced bone marrow failure, 54% required blood transfusions. Four percent (4%) of patients on the Xofigo arm and 2% on the placebo arm permanently discontinued therapy due to bone marrow suppression.

In the randomized trial, deaths related to vascular hemorrhage in association with myelosuppression were observed in 1% of Xofigo-treated patients compared to 0.3% of patients treated with placebo. The incidence of infection-related deaths (2%), serious infections (10%), and febrile neutropenia (<1%) were similar for patients treated with Xofigo and placebo. Myelosuppression; notably thrombocytopenia, neutropenia, pancytopenia, and leukopenia; has been reported in patients treated with Xofigo. In the randomized trial, complete blood counts (CBCs) were obtained every 4 weeks prior to each dose and the nadir CBCs and times of recovery were not well characterized. In a separate single-dose phase 1

study of Xofigo, neutrophil and platelet count nadirs occurred 2 to 3 weeks after Xofigo administration at doses that were up to 1 to 5 times the recommended dose, and most patients recovered approximately 6 to 8 weeks after administration [see *Adverse Reactions* (6)].

Hematologic evaluation of patients must be performed at baseline and prior to every dose of Xofigo. Before the first administration of Xofigo, the absolute neutrophil count (ANC) should be $\geq 1.5 \times 10^9/L$, the platelet count $\geq 100 \times 10^9/L$ and hemoglobin ≥ 10 g/dL. Before subsequent administrations of Xofigo, the ANC should be $\geq 1 \times 10^9/L$ and the platelet count $\geq 50 \times 10^9/L$. If there is no recovery to these values within 6 to 8 weeks after the last administration of Xofigo, despite receiving supportive care, further treatment with Xofigo should be discontinued. Patients with evidence of compromised bone marrow reserve should be monitored closely and provided with supportive care measures when clinically indicated. Discontinue Xofigo in patients who experience life-threatening complications despite supportive care for bone marrow failure.

The safety and efficacy of concomitant chemotherapy with Xofigo have not been established. Outside of a clinical trial, concomitant use with chemotherapy is not recommended due to the potential for additive myelosuppression. If chemotherapy, other systemic radioisotopes or hemibody external radiotherapy are administered during the treatment period, Xofigo should be discontinued.

6 ADVERSE REACTIONS

The following serious adverse reactions are discussed in greater detail in another section of the label:

- Bone Marrow Suppression [see *Warnings and Precautions* (5.1)]

6.1 Clinical Trials Experience

Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in the clinical trials of a drug cannot be directly compared to rates in the clinical trials of another drug and may not reflect the rates observed in practice.

In the randomized clinical trial in patients with metastatic castration-resistant prostate cancer with bone metastases, 600 patients received intravenous injections of 50 kBq/kg (1.35 microcurie/kg) of Xofigo and best standard of care and 301 patients received placebo and best standard of care once every 4 weeks for up to 6 injections. Prior to randomization, 58% and 57% of patients had received docetaxel in the Xofigo and placebo arms, respectively. The median duration of treatment was 20 weeks (6 cycles) for Xofigo and 18 weeks (5 cycles) for placebo.

The most common adverse reactions ($\geq 10\%$) in patients receiving Xofigo were nausea, diarrhea, vomiting, and peripheral edema (Table 3). Grade 3 and 4 adverse events were reported among 57% of Xofigo-treated patients and 63% of placebo-treated patients. The most common hematologic laboratory abnormalities in Xofigo-treated patients ($\geq 10\%$) were anemia, lymphocytopenia, leukopenia, thrombocytopenia, and neutropenia (Table 4).

Treatment discontinuations due to adverse events occurred in 17% of patients who received Xofigo and 21% of patients who received placebo. The most common hematologic laboratory abnormalities leading to discontinuation for Xofigo were anemia (2%) and thrombocytopenia (2%).

Table 3 shows adverse reactions occurring in $\geq 2\%$ of patients and for which the incidence for Xofigo exceeds the incidence for placebo.

Table 3: Adverse Reactions in the Randomized Trial

System/Organ Class Preferred Term	Xofigo (n=600)		Placebo (n=301)	
	Grades 1-4 %	Grades 3-4 %	Grades 1-4 %	Grades 3-4 %
Blood and lymphatic system disorders				
Pancytopenia	2	1	0	0
Gastrointestinal disorders				
Nausea	36	2	35	2
Diarrhea	25	2	15	2
Vomiting	19	2	14	2
General disorders and administration site conditions				
Peripheral edema	13	2	10	1
Renal and urinary disorders				
Renal failure and impairment	3	1	1	1

Laboratory Abnormalities

Table 4 shows hematologic laboratory abnormalities occurring in $\geq 10\%$ of patients and for which the incidence for Xofigo exceeds the incidence for placebo.

Table 4: Hematologic Laboratory Abnormalities

Hematologic Laboratory Abnormalities	Xofigo (n=600)		Placebo (n=301)	
	Grades 1-4 %	Grades 3-4 %	Grades 1-4 %	Grades 3-4 %
Anemia	93	6	88	6
Lymphocytopenia	72	20	53	7
Leukopenia	35	3	10	<1
Thrombocytopenia	31	3	22	<1
Neutropenia	18	2	5	<1

Laboratory values were obtained at baseline and prior to each 4-week cycle.

As an adverse reaction, grade 3-4 thrombocytopenia was reported in 6% of patients on Xofigo and in 2% of patients on placebo. Among patients who received Xofigo, the laboratory abnormality grade 3-4 thrombocytopenia occurred in 1% of docetaxel naive patients and in 4% of patients who had received prior docetaxel. Grade 3-4 neutropenia occurred in 1% of docetaxel naive patients and in 3% of patients who have received prior docetaxel.

Fluid Status

Dehydration occurred in 3% of patients on Xofigo and 1% of patients on placebo. Xofigo increases adverse reactions such as diarrhea, nausea, and vomiting which may result in dehydration. Monitor patients' oral intake and fluid status carefully and promptly treat patients who display signs or symptoms of dehydration or hypovolemia.

Injection Site Reactions

Erythema, pain, and edema at the injection site were reported in 1% of patients on Xofigo.

Secondary Malignant Neoplasms

Xofigo contributes to a patient's overall long-term cumulative radiation exposure. Long-term cumulative radiation exposure may be associated with an increased risk of cancer and hereditary defects. Due to its mechanism of action and neoplastic changes, including osteosarcomas, in rats following administration of radium-223 dichloride, Xofigo may increase the risk of osteosarcoma or other secondary malignant neoplasms [see *Nonclinical Toxicology* (13.1)]. However, the overall incidence of new malignancies in the randomized trial was lower on the Xofigo arm compared to placebo (<1% vs. 2%; respectively), but the expected latency period for the development of secondary malignancies exceeds the duration of follow up for patients on the trial.

Subsequent Treatment with Cytotoxic Chemotherapy

In the randomized clinical trial, 16% patients in the Xofigo group and 18% patients in the placebo group received cytotoxic chemotherapy after completion of study treatments. Adequate safety monitoring and laboratory testing was not performed to assess how patients treated with Xofigo will tolerate subsequent cytotoxic chemotherapy.

7 DRUG INTERACTIONS

No formal clinical drug interaction studies have been performed.

Subgroup analyses indicated that the concurrent use of bisphosphonates or calcium channel blockers did not affect the safety and efficacy of Xofigo in the randomized clinical trial.

8 USE IN SPECIFIC POPULATIONS

8.1 Pregnancy Category X [see *Contraindications* (4)]

Xofigo can cause fetal harm when administered to a pregnant woman based on its mechanism of action. While there are no human or animal data on the use of Xofigo in pregnancy and Xofigo is not indicated for use in women, maternal use of a radioactive therapeutic agent could affect development of a fetus. Xofigo is contraindicated in women who are or may become pregnant while receiving the drug. If this drug is used during pregnancy, or if the patient becomes pregnant while taking this drug, apprise the patient of the potential hazard to the fetus and the potential risk for pregnancy loss. Advise females of reproductive potential to avoid becoming pregnant during treatment with Xofigo.

8.3 Nursing Mothers

Xofigo is not indicated for use in women. It is not known whether radium-223 dichloride is excreted in human milk. Because many drugs are excreted in human milk, and because of potential for serious adverse reactions in nursing infants from Xofigo, a decision should be made whether to discontinue nursing, or discontinue the drug taking into account the importance of the drug to the mother.

8.4 Pediatric Use

The safety and efficacy of Xofigo in pediatric patients have not been established. In single- and repeat-dose toxicity studies in rats, findings in the bones (depletion of osteocytes, osteoblasts, osteoclasts, fibro-osseous lesions, disruption/disorganization of the physis/growth line) and teeth (missing, irregular growth, fibro-osseous lesions in bone socket) correlated with a reduction of osteogenesis that occurred at clinically relevant doses beginning in the range of 20 – 80 kBq (0.541 - 2.16 microcurie) per kg body weight.

8.5 Geriatric Use

Of the 600 patients treated with Xofigo in the randomized trial, 75% were 65 years of age and over and while 33% were 75 years of age and over. No dosage adjustment is considered necessary in elderly patients. No overall differences in safety or effectiveness were observed between these subjects and younger subjects, and other reported clinical experience has not identified differences in responses between the elderly and younger patients, but greater sensitivity of some older individuals cannot be ruled out.

8.6 Patients with Hepatic Impairment

No dedicated hepatic impairment trial for Xofigo has been conducted. Since radium-223 is neither metabolized by the liver nor eliminated via the bile, hepatic impairment is unlikely to affect the pharmacokinetics of radium-223 dichloride [see *Clinical Pharmacology* (12.3)]. Based on subgroup analyses in the randomized clinical trial, dose adjustment is not needed in patients with mild hepatic impairment. No dose adjustments can be recommended for patients with moderate or severe hepatic impairment due to lack of clinical data.

8.7 Patients with Renal Impairment

No dedicated renal impairment trial for Xofigo has been conducted. Based on subgroup analyses in the randomized clinical trial, dose adjustment is not needed in patients with existing mild (creatinine clearance [CrCl] 60 to 89 mL/min) or moderate (CrCl 30 to 59 mL/min) renal impairment. No dose adjustment can be recommended for patients with severe renal impairment (CrCl less than 30 mL/min) due to limited data available (n = 2) [see *Clinical Pharmacology* (12.3)].

8.8 Males of Reproductive Potential

Contraception

Because of potential effects on spermatogenesis associated with radiation, advise men who are sexually active to use condoms and their female partners of reproductive potential to use a highly effective contraceptive method during and for 6 months after completing treatment with Xofigo.

Infertility

There are no data on the effects of Xofigo on human fertility. There is a potential risk that radiation by Xofigo could impair human fertility [see *Nonclinical Toxicology* (13.1)].

10 OVERDOSAGE

There have been no reports of inadvertent overdosing of Xofigo during clinical studies.

There is no specific antidote. In the event of an inadvertent overdose of Xofigo, utilize general supportive measures, including monitoring for potential hematological and gastrointestinal toxicity, and consider using medical countermeasures such as aluminum hydroxide, barium sulfate, calcium carbonate, calcium gluconate, calcium phosphate, or sodium alginate.¹

Single Xofigo doses up to 250 kBq (6.76 microcurie) per kg body weight were evaluated in a phase 1 clinical trial and no dose-limiting toxicities were observed.

13 NONCLINICAL TOXICOLOGY

13.1 Carcinogenesis, Mutagenesis, Impairment of Fertility

Animal studies have not been conducted to evaluate the carcinogenic potential of radium-223 dichloride. However, in repeat-dose toxicity studies in rats, osteosarcomas, a known effect of bone-seeking radionuclides, were observed at clinically relevant doses 7 to 12 months after the start of treatment. The presence of other neoplastic changes, including lymphoma and mammary gland carcinoma, was also reported in 12- to 15-month repeat-dose toxicity studies in rats.

Genetic toxicology studies have not been conducted with radium-223 dichloride. However, the mechanism of action of radium-223 dichloride involves induction of double-strand DNA breaks, which is a known effect of radiation.

Animal studies have not been conducted to evaluate the effects of radium-223 dichloride on male or female fertility or reproductive function. Xofigo may impair fertility and reproductive function in humans based on its mechanism of action.

17 PATIENT COUNSELING INFORMATION

Advise patients:

- To be compliant with blood cell count monitoring appointments while receiving Xofigo. Explain the importance of routine blood cell counts. Instruct patients to report signs of bleeding or infections.
- To stay well hydrated and to monitor oral intake, fluid status, and urine output while being treated with Xofigo. Instruct patients to report signs of dehydration, hypovolemia, urinary retention, or renal failure / insufficiency.
- There are no restrictions regarding contact with other people after receiving Xofigo. Follow good hygiene practices while receiving Xofigo and for at least 1 week after the last injection in order to minimize radiation exposure from bodily fluids to household members and caregivers. Whenever possible, patients should use a toilet and the toilet should be flushed several times after each use. Clothing soiled with patient fecal matter or urine should be washed promptly and separately from other clothing. Caregivers should use universal precautions for patient care such as gloves and barrier gowns when handling bodily fluids to avoid contamination. When handling bodily fluids, wearing gloves and hand washing will protect caregivers.
- Who are sexually active to use condoms and their female partners of reproductive potential to use a highly effective method of birth control during treatment and for 6 months following completion of Xofigo treatment.



Manufactured for:

Bayer HealthCare

Bayer HealthCare Pharmaceuticals Inc.
Wayne, NJ 07470

Manufactured in Norway

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Welcome to



SAN FRANCISCO

BY AMATO J. GIACCIA, PHD

PHOTOGRAPHS: © SAN FRANCISCO TRAVEL ASSOCIATION PHOTO

There are few places in the world where a seven-by-seven mile area of land can have as many diverse offerings as the picturesque city of San Francisco. For ASTRO's 56th Annual Meeting, Moscone Center will serve as headquarters for ASTRO members and guests. Ironically, Mayor George Moscone initially opposed the development of a convention center in the South of Market (SoMa) neighborhood as he believed it would have forced out many of the low-income working class inhabitants of the area. Today, it represents the centerpiece of the redevelopment renaissance of the SoMa neighborhood and is one of the fastest growing areas of the city.

The diversity of San Francisco is best reflected in its neighborhoods, some which possess highly recognizable names, such as Golden Gate, Fishermans Wharf and Union Square, housing historic landmarks such as The Golden Gate Bridge, The Presidio, Ghirardelli Square and Alcatraz Island.

In contrast to these well-known neighborhoods, San Francisco also boasts more eclectic neighborhoods including Twin Peaks, The Mission



Golden Gate Bridge at night. *Inset:* Cable cars are more than 140 years old and reach a top speed of 9.5 mph.

Welcome to SAN FRANCISCO

and The Haight, which are home to the San Francisco Zoo, artist enclaves and the “Hippie Movement,” respectively. These areas are well worth visiting to glimpse the specter of a unique cultural past and to be entertained in comedy clubs, great coffee houses (local favorites Café Du Soleil and Bean There) and live performances by well-known and little-known musicians and singers. For the bold, there is the Aub Zam Zam Club, famous for its gin martinis. In the old days, ordering a vodka martini would have gotten you thrown out of the club. The Haight is also known for the famous “Red Victorian Hotel” and its restored Victorian-era homes known as “painted Lady Victorians.”

For those wanting a higher level of sophistication than the Haight, the San Francisco War Memorial Opera House is a good choice. The War Memorial Opera House, which seats more than 3,000 opera lovers, is located on the opposite side of the street from City Hall. The building and its famous dome were completed in 1932 for the then unbelievable sum of \$4 million. ASTRO attendees will have the option to attend Bellini’s “Norma,” starring Daveda Karanas and Marco Berti on September 14 or the new production of “Susannah” by Carlisle Floyd

on September 16. The opera house is a spectacular building and worth touring regardless of whether or not you are an opera lover.

For all of its many cultural offerings, San Francisco has made its reputation for its award-winning food and drink. There is every level of restaurant and saloon to choose from, and too little time to partake of all of them. However, for those of you who are culinary aficionados, there are several award-winning restaurants worth trying when you visit: Gary Danko, NOPA, Frances, La Folie, The Slanted Door, Coi, Fleur de Lys in San Francisco, Trader Vic’s in Emeryville, Chez Panisse in Berkley, and for the truly adventurous, The French Laundry in Yountville. Reservations are essential for all of these eateries, and should be made months ahead of time.

For those who are going to extend their stay past ASTRO, the wine country of northern California should be on your list. Three regions in particular are worth visiting: Sonoma

Valley and Russian River in Sonoma County and Napa Valley in Napa County. Even for the abstemious visitor, the scenery in wine country is breathtaking, and there are a host of activities from hiking, bicycling and riding in a hot air balloon, to visiting the Culinary Institute of America Restaurant School or having lunch on the Napa Valley Wine Train. You will not be disappointed. For those who prefer water activities, Santa Cruz and Monterey provide the backdrop for surfing, kayaking, sailing or catching some sun at the beach.

San Francisco is also home to the five-time Super Bowl Champion 49ers, and the two-time World Series Champion Giants. For all the sports enthusiasts, there will be one home game for our Giants on September 14 against the Dodgers, and an NBC game of the week for the 49ers against the Chicago Bears in new Levi Stadium in Santa Clara. The Sharks and Warriors seasons start later in the fall.

The Bay Area is one of the world’s

(Clockwise from top right): Nearly 200 murals line the streets and alleys in the Mission District; the War Memorial Opera House is home to the San Francisco Opera, the second-largest opera company in North America, and seats more than 2,700; the Transamerica Pyramid is the tallest skyscraper in the San Francisco skyline; and the San Francisco-Oakland Bay Bridge is the longest high-level bridge in the world at 8.4 miles.



leading hubs for technology that has transformed electronics, computing, music, ecommerce, communication and biotechnology. Many have made the journey to this area with nothing more than their ideas, and a few determined and focused individuals succeeded, starting Cisco, Apple, eBay, Twitter, Facebook and Genentech. The success of these companies lies as much with the investors who took the chance and invested in the people and ideas as it does with the inventors of the technology. We are all proud of the technological revolution that started and is still continuing in the Bay Area.

Interestingly, the biotechnology revolution owes its beginnings to a Stanford University patent in 1980 on recombinant DNA technology, which listed Stan Cohen from Stanford University and Herb Boyer from the University of California San Francisco (UCSF) as inventors. This patent served as the springboard for approximately 2,500 commercial products that were produced by more than 450 companies that resulted in more than \$35 billion in sales and \$255 million in licensing revenues for Stanford and UCSF, which reinvested these pro-

ceeds in research and development. This was an incredibly useful patent.

Most importantly, the impact of the technology revolution for radiation oncology can be traced back 57 years to the vision of Henry Kaplan, MD, and his colleagues at Stanford University. He joined Stanford Hospital, located at the time in San Francisco, to transform the linear accelerator from a radiation-generating device in the physics department to a machine to cure individuals afflicted with cancer. Many millions of patients have been successfully treated with linear accelerators, in large part due to Dr. Kaplan



and his goal of translating experimental radiation producing machines into therapeutic devices. Furthermore, this device stimulated one of the first technology companies in Silicon Valley, Varian Associates. Dr. Kaplan was also one of the driving forces behind the development of ASTRO as a Society focused on treating patients with radiation. It is fitting that ASTRO's Annual Meeting is going to be held in San Francisco, the birthplace of the linear accelerator in the western hemisphere.

To paraphrase Rudyard Kipling, "San Francisco has only one drawback – 'tis hard to leave." The weather should be great, the venue is spectacular, and the activities are bountiful. Welcome to the 2014 ASTRO Annual Meeting at Moscone Center in San Francisco.

Dr. Giaccia is the Jack, Lulu and Sam Willson Professor in Cancer Biology in the Department of Radiation Oncology at Stanford University in Stanford, California. He is also the director of the Cancer Biology Program and associate director for basic sciences in the Stanford Cancer Institute.



MOSCONE CENTER NORTH AND SOUTH

747 Howard St.
San Francisco, CA 94103
www.moscone.com

All activities take place in Moscone Center North and South unless otherwise stated. All information is correct as of July 11, 2014, and is subject to change.

ATTENDEE REGISTRATION**North Lobby****Attendee Registration Hours**

Saturday, September 13	8:00 a.m. - 5:00 p.m.
Sunday, September 14	6:30 a.m. - 5:00 p.m.
Monday, September 15	7:00 a.m. - 6:00 p.m.
Tuesday, September 16	7:00 a.m. - 5:00 p.m.
Wednesday, September 17	7:00 a.m. - 2:00 p.m.

EXHIBITOR REGISTRATION**South Lobby****Exhibitor Registration Hours**

Thursday, September 11	8:00 a.m. - 5:00 p.m.
Friday, September 12	8:00 a.m. - 5:00 p.m.
Saturday, September 13	8:00 a.m. - 5:00 p.m.
Sunday, September 14	7:00 a.m. - 5:00 p.m.
Monday, September 15	8:00 a.m. - 5:00 p.m.
Tuesday, September 16	8:00 a.m. - 5:00 p.m.

ABSTRACTS AND EMBARGO POLICY

The full text of the abstracts selected for oral and poster presentation at the Annual Meeting will be available on the Annual Meeting Online Conference Planner and app. All abstracts are published in a supplement of the September 1, 2014 issue of the *International Journal of Radiation Oncology • Biology • Physics* (www.redjournal.org).

All abstracts are embargoed and remain confidential until the date and time of presentation at the Annual Meeting. If you have any questions about the embargo policy, please contact ASTRO's Media Relations Manager Michelle Kirkwood at 703-286-1600 or press@astro.org.

AFFILIATED MEETINGS**38TH ASRT RADIATION THERAPY CONFERENCE****September 14-16, 2014***Hilton San Francisco Union Square*

The 38th Annual ASRT Radiation Therapy Conference will take place at the Hilton San Francisco Union Square. ASTRO registered attendees may attend ASRT sessions by paying a reduced registration fee of \$195. Proof of registration (registration confirmation or badge) is required to receive this reduced rate. If you have not registered to attend the ASRT conference but would like to do so, please register on-site at the Hilton San Francisco Union Square.

31ST SROA ANNUAL MEETING**September 14-17, 2014***Hyatt Regency San Francisco*

The 31st SROA Annual Meeting will take place at the Hyatt Regency San Francisco. ASTRO registered attendees may attend the SROA general sessions by paying a reduced registration fee of \$210. Proof of registration (registration confirmation or badge) is required to receive this reduced rate. If you have not registered to attend the SROA conference but would like to do so, please register on-site at the Hyatt Regency San Francisco.

ASTRO CAREER FAIR**Rooms 250-262**

Take advantage of the ASTRO Career Fair to connect with candidates for employment. Equipped with computers and printers for your convenience, the Career Fair is available for employers to conduct interviews with job applicants. Employers and applicants must register through the online ASTRO Career Center in order to schedule interviews at the on-site Career Fair.

Hours of Operation:

Saturday, September 13	3:00 p.m. - 6:00 p.m.
Sunday, September 14	8:00 a.m. - 6:00 p.m.
Monday, September 15	8:00 a.m. - 6:00 p.m.
Tuesday, September 16	8:00 a.m. - 6:00 p.m.

Private interview rooms are also available. These rooms are ideal if you have multiple interviews to conduct or just need more privacy. A limited number of meeting rooms will be available for three-hour periods Saturday, September 13 through Tuesday, September 16. For more information, contact Todd Karstaedt at toddk@astro.org.

ASTRO RESOURCE CENTER

North Lower Lobby, outside Hall D

Visit the ASTRO Resource Center, located outside Hall D this year. Here you can learn about ASTRO member benefits and get information on new programs such as APEX: Accreditation Program for Excellence and the new patient safety initiative, RO-ILS: Radiation Oncology Incident Learning System™. You can also pick up materials on upcoming educational meetings and webinars, patient advocacy and more. ASTRO's knowledgeable staff will be on hand to answer any questions about ASTRO membership. A professional photographer will be available during designated hours so that you can get your picture taken and uploaded to the ASTRO membership directory. The Survivor Circle is also located in the Resource Center.

Hours of Operation:

Saturday, September 13	8:00 a.m. - 5:00 p.m.
Sunday, September 14	8:00 a.m. - 5:00 p.m.
Monday, September 15	8:00 a.m. - 5:00 p.m.
Tuesday, September 16	8:00 a.m. - 5:00 p.m.
Wednesday, September 17	8:00 a.m. - 12:00 p.m.



South Lobby

ASTRO Connect is the perfect place to RECHARGE, RELAX and REVIVE.

This networking lounge offers a place to charge your devices, network with colleagues, have informal meetings, make new connections within the radiation oncology community and check in on social media sites.

Funded in part by Elekta

Connect with your ASTRO colleagues.



ASTRO PAC LOUNGE

North Lower Lobby, across from CE Central

ASTRO's political action committee (PAC) is offering access to an exclusive lounge for all ASTRO members who have donated to the ASTRO PAC in 2014. The PAC lounge will feature Internet access, coffee and beverages, snacks and a place to rest between sessions. Members who have not made their contribution yet will be able to donate on-site. ASTRO PAC provides ASTRO with the opportunity to more fully participate in government and to ensure our members' voices are being heard by key policy makers on Capitol Hill. Be sure to stop by the lounge to get the most recent legislative and election updates. For more information, please email shandib@astro.org or visit www.astro.org/ASTROPAC.

Hours of Operation:

Sunday, September 14	10:00 a.m. - 5:00 p.m.
Monday, September 15	10:00 a.m. - 5:30 p.m.
<i>Happy Hour and Legislative Issue Forum</i>	4:30 p.m. - 5:30 p.m.
Tuesday, September 16	10:00 a.m. - 5:00 p.m.

SAN FRANCISCO TRAVEL INFORMATION

South Lobby

Attendees can stop by the San Francisco Travel Information desk located in the South Lobby at Moscone Center to receive restaurant recommendations and San Francisco visitor guides, maps, destination information and local directions.

Hours of Operation:

Sunday, September 14	9:00 a.m. - 5:00 p.m.
Monday, September 15	9:00 a.m. - 5:00 p.m.
Tuesday, September 16	9:00 a.m. - 5:00 p.m.



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ASTRO ONLINE CONFERENCE PLANNER

YOUR ANNUAL MEETING GUIDE

Start planning your Annual Meeting experience with the Online Conference Planner. Build your personalized "My Plan" with your customized schedule.

- Search sessions by day, track or speaker.
- Search exhibitors by name, booth number or product/service category.
- Location sessions and exhibitors with customized maps.
- Search and view the full abstracts. (Available on Sunday, September 14, 2014).
- Preview general meeting information.
- Access your "MyPlan" – your personal Annual Meeting schedule.
- View convention center maps.
- Take notes on a session or exhibitor and access your notes from your mobile device.
- Exchange messages with colleagues attending the meeting using Find-a-Friend.
- Integrates with ASTROmobile, the official meeting app, so that you can build your schedule in the Online Conference Planner and view your "My Plan" in ASTROmobile.



Go to www.astro.org/conferenceplanner to start using the Online Conference Planner.

BUSINESS CENTER

South Lower Lobby

The business center is conveniently located in the South Lower Lobby of Moscone Center. The business center offers a variety of services including packing and shipping, sign production, copying and office supplies.

Hours of Operation:

Saturday, September 13	8:00 a.m. – 5:00 p.m.
Sunday, September 14	9:00 a.m. – 5:00 p.m.
Monday, September 15	9:00 a.m. – 5:00 p.m.
Tuesday, September 16	9:00 a.m. – 5:00 p.m.
Wednesday, September 17	9:00 a.m. – 5:00 p.m.

BUSINESS MEETING

Tuesday, September 16, 2014

11:30 a.m. – 1:00 p.m.

Room 102/103

ASTRO voting members (Active, Affiliate or International members) are invited to attend the Business Meeting on Tuesday, September 16, from 11:30 a.m. – 1:00 p.m. Leaders of the Society will discuss and present important topics of interest to ASTRO members. You should not miss this important meeting. Lunch will be served.

CE CENTRAL

Outside Hall E

Do you have questions about continuing education or the recent changes to the American Board of Radiology's (ABR) Maintenance of Certification (MOC) program? Staff from ASTRO and the ABR will be on hand during the meeting to answer your individual questions about continuing education and MOC requirements.

CE Central computer stations provide access for you to:

- Complete your continuing education and meeting evaluation.
- View/print a session tracking form.
- Search abstracts.
- Search exhibitors.
- Update your Online Conference Planner.

Hours of Operation:

Saturday, September 13	8:30 a.m. – 6:00 p.m.
Sunday, September 14	7:30 a.m. – 6:30 p.m.
Monday, September 15	7:00 a.m. – 6:00 p.m.
Tuesday, September 16	7:30 a.m. – 6:30 p.m.
Wednesday, September 17	7:30 a.m. – 5:00 p.m.

CYBER CAFÉ

South Lobby

ASTRO attendees can check email, browse the Internet, print a boarding pass and registration receipt and much more at one of several computer stations located in the South Lobby.

Hours of Operation:

Saturday, September 13	8:00 a.m. - 5:00 p.m.
Sunday, September 14	6:30 a.m. - 5:00 p.m.
Monday, September 15	7:00 a.m. - 6:00 p.m.
Tuesday, September 16	7:00 a.m. - 5:00 p.m.
Wednesday, September 17	7:00 a.m. - 4:30 p.m.

ELECTRONIC FOOD AND BEVERAGE CARD

Attendees receive a \$10 electronic food and beverage card with their registration materials. This card can be used for coffee and beverages as well as food items located at concession stands in the Exhibit Hall. This card will not be accepted at food outlets outside of the Exhibit Hall. Lost cards will not be replaced.

EXHIBIT HALL

Halls A-C

Learn about the latest products in cancer treatment and care in the Exhibit Hall. See page 42 for a list of 2014 exhibitors.

Hours of Operation:

Sunday, September 14	10:00 a.m. - 5:00 p.m.
Monday, September 15	10:00 a.m. - 5:00 p.m.
Tuesday, September 16	10:00 a.m. - 5:00 p.m.

EXHIBITOR PRODUCT INFORMATION

New this year, your registration badge will include an Aztec code that contains your contact information. This code can be scanned by exhibitors in the Exhibit Hall so that you may request information on products and services offered by the company. Your contact information will include your email address. Please stop by Attendee Registration located in the North Lobby if you would like to change your contact information.

FACULTY/VIP OFFICE

Room 120

Faculty members and VIPs should check in at the Faculty/VIP Office to pick up registration materials and receive last-minute updates and program changes. The Faculty/VIP Office is conveniently located next to the Speaker Ready Room. Faculty and VIPs are welcome in the Faculty/VIP Office throughout the meeting. Faculty members include:

- Educational session speakers.
- Panel moderators and presenters.
- Scientific program moderators and discussants.
- eContouring Learning Lab presenters.
- Presidential Symposium speakers.
- Keynote speakers and introducers.
- Nursing program speakers.
- International Symposium speakers.

Note: *Presenters of abstracts are not classified as faculty and should follow attendee registration instructions.*

Hours of Operation:

Saturday, September 13	6:45 a.m. - 6:00 p.m.
Sunday, September 14	6:45 a.m. - 6:15 p.m.
Monday, September 15	6:45 a.m. - 5:45 p.m.
Tuesday, September 16	6:45 a.m. - 6:15 p.m.
Wednesday, September 17	6:45 a.m. - 4:30 p.m.

FIRST AID

Across from Room 106

Phone: 415-974-4090 or ext. 4090 from a house phone

First Aid is located across from Room 106 in the Moscone Center South building. The first aid phone number is 415-974-4090 or dial ext. 4090 from a house phone. In an emergency, please contact first aid or go to ASTRO Registration and have a staff person contact security.

Hours of Operation:

Monday, September 8	8:00 a.m. - 5:00 p.m.
Tuesday, September 9	8:00 a.m. - 5:00 p.m.
Wednesday, September 10	8:00 a.m. - 5:00 p.m.
Thursday, September 11	8:00 a.m. - 8:00 p.m.
Friday, September 12	8:00 a.m. - 8:00 p.m.
Saturday, September 13	7:00 a.m. - 8:00 p.m.
Sunday, September 14	6:30 a.m. - 6:00 p.m.
Monday, September 15	7:00 a.m. - 7:00 p.m.
Tuesday, September 16	7:00 a.m. - 10:00 p.m.
Wednesday, September 17	7:00 a.m. - 8:00 p.m.
Thursday, September 18	7:00 a.m. - 5:00 p.m.

INDUSTRY-EXPERT THEATER*

Exhibit Hall, Room 100

This activity allows companies to present their noteworthy products and services through a live presentation in the Industry-Expert Theater located in the Exhibit Hall. Seating is available on a first-come, first-served basis. The Industry-Expert Theater content and view expressed therein are those of the exhibitor and not of ASTRO.

Sunday, September 14

12:15 p.m. – 1:15 p.m.

Company: Accuray

Box lunch provided.

Monday, September 15

6:45 a.m. – 7:45 a.m.

Company: Augmenix

Continental breakfast provided.

Tuesday, September 16

6:45 a.m. – 7:45 a.m.

Company: Xoft Inc.

Continental breakfast provided.

Monday, September 15

10:15 a.m. – 10:45 a.m.

Company: Siemens

Refreshments provided.

Tuesday, September 16

11:45 a.m. – 12:45 p.m.

Company: ScandiDos

Box lunch provided.

Monday, September 15

12:30 p.m. – 1:30 p.m.

Company: Bayer HealthCare

Box lunch provided.

**Industry-Expert Theaters are not certified for continuing medical education credit.*

INDUSTRY SATELLITE SYMPOSIUM

ASTRO has reviewed and approved these symposia as appropriate for presentation. These symposia represent the content and views of the sponsors and are not part of the official ASTRO Annual Meeting.

Monday, September 15

6:00 p.m. – 9:30 p.m. (Registration from 6:00 to 7:00 p.m.; reception to follow the program at 9:00 p.m.)

Proton Therapy: Clinical Applications and Outcomes, Delivery Methods and Biologic Parameters
San Francisco Jazz Center

Accreditation: The University of Florida College of Medicine is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

CME Credits: The University of Florida College of Medicine designates this live activity for a maximum of 2.0 *AMA PRA Category 1 Credits™*. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Target Audience: Radiation oncologists actively involved in the management of patients with cancer, physicists involved in clinical medical physics, and allied health care professionals including but not limited to nurses, therapists, dosimetrists and administrators.

This activity is hosted by the University of Florida and is supported by a grant from IBA.

INFORMATION DESK

North and South Lobbies

Have a question? Stop by the Information Desk to get your questions answered.

Hours of Operation:

Saturday, September 13	8:00 a.m. - 5:00 p.m.
Sunday, September 14	6:30 a.m. - 5:00 p.m.
Monday, September 15	7:00 a.m. - 6:00 p.m.
Tuesday, September 16	7:00 a.m. - 5:00 p.m.
Wednesday, September 17	7:00 a.m. - 4:30 p.m.

LOST AND FOUND

North and South Lobbies

To report a missing item, to check to see if an item has been turned into security or to turn in a lost item, please stop by one of the Information Desks located in the North and South Lobbies.

Hours of Operation:

Saturday, September 13	8:00 a.m. - 5:00 p.m.
Sunday, September 14	6:30 a.m. - 5:00 p.m.
Monday, September 15	7:00 a.m. - 6:00 p.m.
Tuesday, September 16	7:00 a.m. - 5:00 p.m.
Wednesday, September 17	7:00 a.m. - 4:30 p.m.

LUGGAGE/COAT CHECK

North Lobby

Luggage and coat check will be available in the North Lobby at Moscone Center for \$2 per coat or small handbag and \$3 per luggage item.

Hours of Operation:

Saturday, September 13	7:30 a.m. - 6:00 p.m.
Sunday, September 14	6:00 a.m. - 6:30 p.m.
Monday, September 15	7:00 a.m. - 7:00 p.m.
Tuesday, September 16	7:00 a.m. - 6:30 p.m.
Wednesday, September 17	7:00 a.m. - 5:00 p.m.

PARKING

Moscone Center does not have a public parking facility on the premises. Listed below are public parking garages in close proximity to the facility, each of which provide certain reserved spaces for use by authorized, handicapped individuals. Please note: ASTRO does not validate parking.

Fifth and Mission Parking Garage

833 Mission St.

Located between Fourth and Fifth Streets, adjacent to Moscone West

415-982-8522, ext. 18

Hearst Parking Center

45 Third St.

Entrance on Stevenson, 2 blocks from Moscone North and South

415-989-4000

Moscone Center Garage

255 Third St.

Folsom and Howard, across the street from Moscone South's Esplanade Ballroom

415-777-2782 (garage)

415-538-7888 (office)

Museum Parc Garage

300 Third St.

Entrance on Third and Folsom Streets

415-348-0304

POSTER VIEWING

Hall D

Poster Setup Hours

Saturday, September 13	12:00 p.m. - 5:00 p.m.
Sunday, September 14	7:30 a.m. - 10:00 a.m.

Poster Viewing Hours

Sunday, September 14	10:00 a.m. - 5:00 p.m.
Monday, September 15	10:00 a.m. - 6:45 p.m.

Poster Viewing Session and Reception

Tuesday, September 16	5:30 p.m. - 6:45 p.m. 10:00 a.m. - 5:00 p.m.
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Poster Removal Hours

Tuesday, September 16	5:00 p.m. - 7:00 p.m.
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Posters in the following categories will be on display:

Biology	Lymphoma/Hematologic/
Breast	Leukemia
CNS	Non-malignant
Gastrointestinal	Nursing
Genitourinary	Palliative Care
Gynecologic	Patient-reported Outcomes
Head and Neck	Patient Safety
Health Services Research	Pediatrics
History/Education	Physics
Informatics/Bioinformatics	Quality of Life
Lung	Sarcoma

POSTER PICKUP OFFICE**Hall D**

For those poster presenters who chose to use ASTRO's poster printing service, there is a special pickup location in Hall D.

Hours of Operation:

Saturday, September 13	12:00 p.m. - 5:00 p.m.
Sunday, September 14	7:30 a.m. - 5:00 p.m.
Monday, September 15	10:00 a.m. - 5:00 p.m.

POSTER VIEWING SESSION AND RECEPTION**Hall D****Monday, September 15**

5:30 p.m. - 6:45 p.m.

All conference attendees are invited to attend this poster viewing session and reception. During this time, poster presenters are available by their poster to answer questions and discuss their research. Poster award winners are presented their awards at the beginning of this session, and will provide a short oral presentation of their abstract in the poster presentation area within the hall.

Each full conference attendee, exhibitor and Monday one-day conference attendee will receive one drink ticket

that can be used for one complimentary beverage at the Poster Viewing Session and Reception. After your ticket has been redeemed, drinks will be available for purchase. You must be 21 years of age to consume alcoholic beverages. Your drink ticket will be included with your badge in your registration materials.

PRESS ROOM**Rooms 110-111**

Accredited journalists are provided with a press kit and access to cover ASTRO's 56th Annual Meeting. The Press Office will be open daily Sunday, September 14 through Wednesday, September 17. For more information on-site about ASTRO's Press Program and Policies, please contact ASTRO's Press Office at 703-286-1600 or email press@astro.org. For ASTRO press information and policies, please visit www.astro.org/AMPress.

Hours of Operation:

Sunday, September 14	8:00 a.m. - 4:00 p.m.
Monday, September 15	8:00 a.m. - 4:00 p.m.
Tuesday, September 16	8:00 a.m. - 4:00 p.m.
Wednesday, September 17	8:00 a.m. - 12:00 p.m.

Haven't asked
about the
Challenge yet?

Come see our 'mascot' at the ROI Booth

RADIATION ONCOLOGY INSTITUTE (ROI) BOOTH

North Lower Lobby, across from the ASTRO Resource Center

All Annual Meeting attendees are invited to visit the Radiation Oncology Institute (ROI) booth, located near Hall D at Moscone Center. Learn more about the ROI's research initiatives and current projects.

Our mascot, "ROI" the gorilla, will also be on hand for those wishing to accept our Gorilla Challenge. Don't miss out on this great opportunity to show your support for the Institute!

Hours of Operation:

Sunday, September 14	8:00 a.m. - 5:00 p.m.
Monday, September 15	8:00 a.m. - 5:00 p.m.
Tuesday, September 16	8:00 a.m. - 5:00 p.m.
Wednesday, September 17	8:00 a.m. - 12:00 p.m.



SHUTTLE SERVICE TO MOSCONE CENTER

Funded in part by Elekta

Complimentary shuttle service will be provided between Moscone Center and official ASTRO hotels. This is preliminary information only, which is subject to change at any time without notice. Upon arrival in San Francisco, please refer to the sign in your hotel lobby for the most current information.

HOURS OF OPERATION

SATURDAY, SEPTEMBER 13	8:00 A.M. - 6:30 P.M.
SUNDAY, SEPTEMBER 14	6:30 A.M. - 7:00 P.M.
MONDAY, SEPTEMBER 15	6:15 A.M. - 7:30 P.M.
TUESDAY, SEPTEMBER 16	6:15 A.M. - 7:00 P.M.
WEDNESDAY, SEPTEMBER 17	6:30 A.M. - 5:00 P.M.

HOTELS AND BOARDING LOCATIONS

All travel times are approximate pending time of day, day of week and traffic conditions.

ROUTE	HOTEL	BOARDING LOCATION AT HOTEL	APPROXIMATE ONE-WAY TRAVEL TIME	FREQUENCY IN MINUTES
1	Hotel Abri Parc 55 Wyndham San Francisco	On Cyril Magnin, across the street from the Parc 55 Across the street on Cyril Magnin	7-10 minutes	10-15 peak 15-20 nonpeak
2	Clift Hotel Hilton San Francisco Union Square* Hotel Monaco (a Kimpton property) Hotel Nikko San Francisco Serrano Hotel San Francisco	At Hilton San Francisco Curbside on Taylor At Hilton San Francisco At Hilton San Francisco At Hilton San Francisco	8-12 minutes	10-15 peak 15-20 nonpeak
3	Handlery Union Square Hotel JW Marriott San Francisco Union Square Prescott Hotel (a Kimpton property) Villa Florence Hotel Westin St. Francis	At Westin St. Francis At Westin St. Francis At Westin St. Francis At Westin St. Francis Curbside on Post	9-13 minutes	10-15 peak 15-20 nonpeak
4	Grand Hyatt San Francisco Hotel Triton (a Kimpton property) Marriott Union Square San Francisco Sir Francis Drake Hotel (a Kimpton property)	Check the sign in your hotel lobby upon arrival for boarding locations.	10-14 minutes	10-15 peak 15-20 nonpeak
WALK	Courtyard by Marriott San Francisco Downtown Hotel Palomar (a Kimpton property) InterContinental San Francisco Marriott Marquis San Francisco Mosser Hotel, The Palace Hotel, A Luxury Collection Hotel St. Regis Hotel San Francisco W Hotel San Francisco Westin San Francisco Market Street		No shuttle service provided	

*ASRT is being held at the Hilton San Francisco Union Square. Attendees may ride Route 2 from Moscone Center to access the Hilton San Francisco Union Square directly. There is no direct service from hotels to the Hilton San Francisco Union Square. The transfer point for all routes is Moscone Center.

REGISTRANT LOCATOR – FIND-A-FRIEND

Looking to connect with an attendee at the Annual Meeting? You can now use our Find-a-Friend service with ASTROmobile, the official Annual Meeting app. Find-a-Friend allows you to search for an attendee and send messages while at the Annual Meeting.

SMOKING

Moscone Center is a nonsmoking facility.

SPEAKER READY ROOM

Room 121

Faculty members and abstract presenters should upload their PowerPoint presentations in advance of their session in order to have it pre-loaded onto the ASTRO conference network. To ensure presentations have been properly uploaded, faculty members and abstract presenters are asked to check in at the Speaker Ready Room to review the information and make any last minute edits.

Speakers should plan to save their presentation on a portable device and bring it to the Speaker Ready Room at least 24 hours in advance of their presentation or upon arrival at Moscone Center.

Hours of Operation:

Saturday, September 13	6:45 a.m. - 6:00 p.m.
Sunday, September 14	6:45 a.m. - 6:15 p.m.
Monday, September 15	6:45 a.m. - 5:45 p.m.
Tuesday, September 16	6:45 a.m. - 6:15 p.m.
Wednesday, September 17	6:45 a.m. - 4:30 p.m.

SURVIVOR CIRCLE

ASTRO Resource Center, outside of Hall D

In 2003, ASTRO created the Survivor Circle as a way to honor cancer survivors. Each year, ASTRO recognizes two local patient support organizations and features them at the Survivor Circle at the Annual Meeting. It was our hope that by partnering with local organizations in the cities that host our meeting, we would be able to give back to the cities we visit and to help raise awareness of these important organizations among our members. Through generous donations from exhibitors and attendees, ASTRO raises funds for the two organizations featured in the Survivor Circle. Since its inception, the Survivor Circle has raised more than \$250,000 for our partner organizations. Stop by the Survivor Circle to learn more about the winners of this year's Survivor Circle Grants, the Breast and Gyn Health Project and Kids Konnected.

TRANSPORTATION

San Francisco offers a number of convenient transportation options to help attendees easily get around the city.

Airport

The San Francisco International Airport (SFO) is approximately 14 miles from Moscone Center and Union Square. Board outbound scheduled buses, shared ride and long distance vans, taxis, and hotel and rental car courtesy vans located in the arrival area of each terminal.

Taxi

On average, a one-way taxi ride from the San Francisco International Airport (SFO) to Moscone Center and Union Square is approximately \$45 one-way (gratuity not included).

SFMTA

SFMTA is San Francisco's public transportation system that provides light rail and bus services throughout downtown and to and from the airport. The fare for rail and bus is \$2 and for cable car \$6. For more information on rates and schedules, visit www.sfmta.com.

BART/CALTRAIN

BART (Bay Area Rapid Transit) is a fast, easy and inexpensive way to get to San Francisco and around the Bay Area. Trains arrive at the San Francisco International Airport (SFO) Terminal every 15 minutes. It's just 30 minutes to downtown San Francisco and a one-way ticket from the airport to downtown is \$8.25.

VIRTUAL MEETING

All full conference attendees receive the Virtual Meeting with their registration at no additional cost. With the Virtual Meeting, you can extend your learning experience with access to the 2014 ASTRO sessions long after the meeting is over. You will receive streaming content that has been digitally recorded live and published as audio synchronized to the speaker presentations.* Approximately three weeks after the meeting, full conference attendees will receive an email with a link providing access to the Virtual Meeting.

**Presentations are included in the Virtual Meeting as approved per faculty.*

WIRELESS INTERNET ACCESS

Complimentary wireless Internet access is provided in all common areas and session rooms throughout Moscone Center. Please note that this does not include the Exhibit Hall or Poster area. Attendees can bring their laptop to check email, complete the evaluation or surf the Internet. Laptops must have a Wi-Fi card to connect.

**Enroll
NOW!**

RO•ILS

**RADIATION ONCOLOGY™
INCIDENT LEARNING SYSTEM**

Sponsored by ASTRO and AAPM

Safety
¹safe • ty

noun \ 'sāf-tē\

- the quality of averting or not causing injury, danger or loss.
- the control of recognized hazards to achieve an acceptable level of risk.
- a place that is free from harm or danger: a safe place.

RO•ILS
¹ro • ils

noun \ 'ròi(-ə)ls\

- Radiation Oncology Incident Learning System.
- a system to facilitate safer and higher quality care in radiation oncology at no cost to providers or facilities.
- the only medical specialty society-sponsored radiation oncology incident learning system.

Benefits of participation:

- Submit information on incidents or near-misses in a confidential, non-punitive environment.
- Track and analyze internal incidents and near-misses.
- Receive reports on events from the national database with information on equipment, technique and dosimetric severity scale.
- Receive quarterly, institution-specific benchmarking reports.

The RO-ILS mission is to facilitate safer and higher quality care in radiation oncology by providing a mechanism for shared learning in a secure and non-punitive environment.

MOC Part 4: PQI

This activity is qualified for physicians and physicists by the American Board of Radiology (ABR) in meeting the criteria for practice quality improvement, toward the purpose of fulfilling requirements in the ABR Maintenance of Certification Program.

**Visit www.astro.org/ROILS to enroll.
email: ROILS@astro.org**

ASTRO®

EXHIBITOR LIST

(As of July 16, 2014)

For the most current exhibitor information or to view the floor plan of the Exhibit Hall, please visit www.astro.org/exhibithall.

.decimal
21st Century Oncology*
A2J Healthcare
ABL Medical
Acceleronics
AccuBoost
Accuray Inc.*
Advanced Shielding
Technologies Inc.
AEP Linac
Aktina Medical Corporation*
ALATRO (Asociacion
Iberoamericana De Terapia
Radiante Oncologica
Alliance Oncology*
AMAC - American Medical
Accounting and Consulting*
AMAG Pharmaceuticals Inc.
American Association of Medical
Dosimetrists
American Society of Clinical
Oncology
Ancer Medical
Anzai Medical Co. Ltd.
APSHO
AQUILAB SAS*
architecton*
Augmenix
Bard Medical Division
Bayer HealthCare
Beekley Medical
Best Medical International Inc.*
Bionix Radiation Therapy
BK Medical
Bogardus Medical Systems Inc.*
Boiron
Brainlab*
BSD Medical*
Buck Engineering & Consulting
GMBH
C4 Imaging
Cancer CarePoint Inc.*
Cancer Treatment Centers of
America
Carbon Medical Technologies
Carl Zeiss Meditec Inc.*
CDR Systems Inc.*
Cemar Electro Inc.*
Churchill Consulting Inc.*
Cianna Medical
CIRS*
CivaTech Oncology*
CIVCO Medical Solutions*
Cleveland Clinic Taussig Cancer
Institute
Coumans Care
C-RAD Inc.*
Cura Medical Technologies

CYPRA
D3 Oncology Solutions*
Demos Medical Publishing
DIACOR
DOSIsoft
e+CancerCare
e2v
Eckert & Ziegler BEBIG Inc.
Elekta*
Elsevier
Equicare Health Inc.*
Everson Tesla Inc.
Focal Therapeutics
Foss Therapy Services Inc.
Full Circle PR
Gammawest Cancer Services
Gammex
GE Healthcare
GenomeDx Biosciences
Genomic Health Inc.
Gold Anchor*
GuangZhou Raydose Software
Technology LLC
H&H Design-Build*
Hermes Medical Solutions Inc.
Hitachi
Hologic Inc.*
HyperDrive Medical
IBA
Imaging Technology News
ImpediMed Inc.*
INSYS Therapeutics Inc.
IntraOp Medical Corporation
IOP Publishing
Iron Medical Systems Inc.
IsoAid*
IsoRay Medical Inc.*
James L. Davis*
Klarity*
Kobold LLC*
Kunshan GuoLi Vacuum Electric
Co. Ltd.
Landauer Inc.*
LAP of America LLC*
Leoni CIA Cable Systems S.A.S.
Liberty Medical Inc.*
LifeLine Software Inc.*
LinaTech LLC
Logos Systems International
MACROMEDICS BV
Max Medical Co. Ltd.
Maxim Government Services
Mayo Clinic
Mevion Medical Systems*
Miadern
Mick Radio-Nuclear Inc., an Eckert
& Ziegler BEBIG Company*
Micropos Medical*

MIM Software
Mirada Medical
Mission Search
Mitsubishi Electric Corporation
MM Leadership Management
Solutions
Mobius Medical Systems
Modus Medical Devices Inc.
MPM Medical Inc.*
MuCheck-Oncology Data Systems*
Myriad Genetic Laboratories
NELCO*
Novocure
Nualine Laser
Oncology Services International*
Oncology Systems Limited
Orfit Industries America*
Oxford Instruments Service LLC
Paramed Medical Systems Inc.
Patient Relationship Management
(PRM)
PBPC/AME Publishing Company
P-Cure Ltd.
Perioperative Services LLC
Perkins + Will
Phantom Laboratory
Philips Healthcare
Pitts Little Corp.
Precision X-Ray*
Precisus Euromechanics GmbH
ProNova Solutions
ProTom International Inc.*
Prowess Inc.
PTW
Qfix*
QLRAD Inc.
RAD Technology Medical Systems
RadiaDyne
Radiation Business Solutions
Radiation Products Design Inc.*

Radiation Therapy Oncology Group
Radiological Imaging Technology - RIT*
Radiology Oncology Systems Inc.
RaySearch Laboratories AB
Revenue Cycle Inc.*
RK Builders Inc.
RS&A Inc.
S+S Par Scientific
ScandiDos
Sensus Healthcare*
Shandong Xinhua Medical Instruments Co. Ltd.
Shielding Construction Solutions Inc.*
Siemens Medical Solutions USA Inc.
Siris Medical
SIT USA
Sky Factory, The
Spectrum Pharmaceuticals Inc.*
Springer
Standard Imaging*
Sumitomo Heavy Industries Ltd.
Sun Nuclear Corporation*
Suremark Company, The
Synergen Health
Technical Prospects LLC
Theragenics Corporation*
Top Grade Medical Equipment Co. Ltd.
Toshiba Medical Systems
TRG Oncology Equipment*
Vantage Oncology
Varian Medical Systems*
Veritas Medical Solutions*
Virtual Ltd.
ViewRay Inc.*
Vision RT Ltd.*
Wolters Kluwer Health
Xecan
Xoft, a subsidiary of iCAD Inc.*
Xstrahl Limited

EXHIBIT HALL HOURS

Halls A-C

Meet with ASTRO exhibitors to learn about the latest products and services in cancer treatment and care.

Hours of Operation:

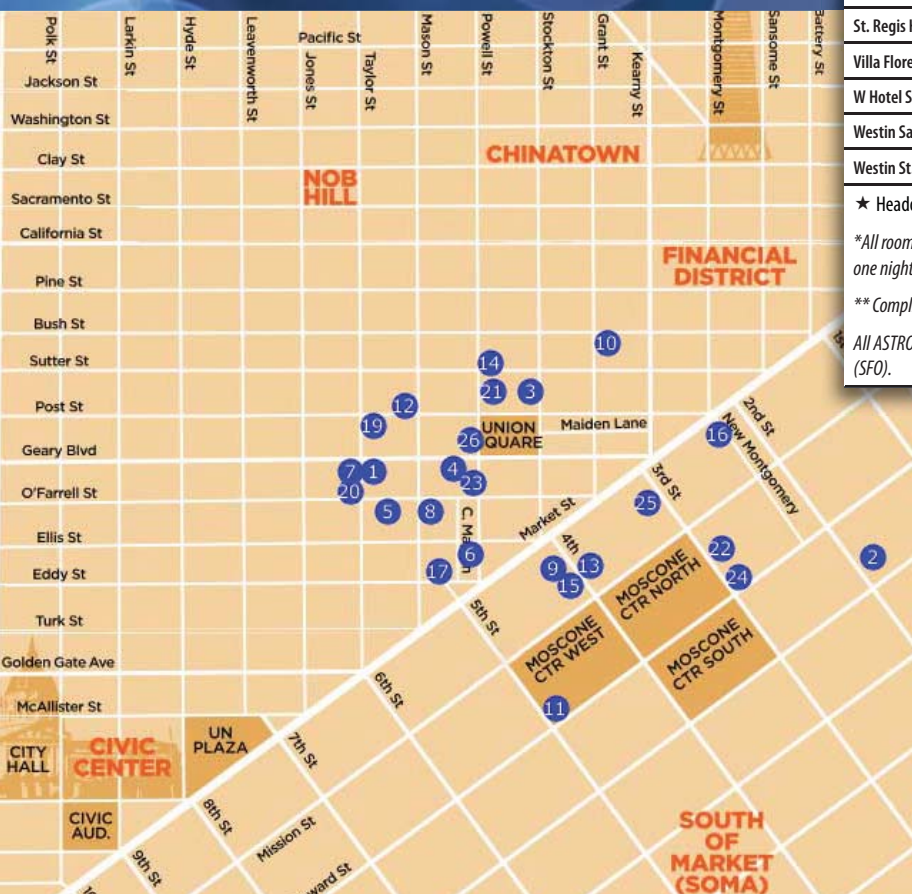
SUNDAY, SEPTEMBER 14
MONDAY, SEPTEMBER 15
TUESDAY, SEPTEMBER 16

10:00 A.M. - 5:00 P.M.
10:00 A.M. - 5:00 P.M.
10:00 A.M. - 5:00 P.M.

*Enhanced ROMarketplace listing
Ambassadors are in **Bold**

HOTEL MAP

TARGETING CANCER: TECHNOLOGY & BIOLOGY



Hotel	Map Location	Sgl/Dbl/Dbl-Dbl*	Distance to Moscone Center
Clift Hotel	1	\$295	7 Blocks
Courtyard by Marriott San Francisco Downtown	2	\$ 285	2.5 Blocks
Grand Hyatt San Francisco (ASTRO Premier Hotel)	3	\$250	8 Blocks
Handlery Union Square Hotel - Historic	4	\$189	5.5 Blocks
Handlery Union Square Hotel - Premium	4	\$219	5.5 Blocks
Hilton San Francisco Union Square (ASTRO Premier Hotel) - Classic Room	5	\$280	4 Blocks
Hilton San Francisco Union Square (ASTRO Premier Hotel) - Deluxe Room	5	\$303	4 Blocks
Hilton San Francisco Union Square (ASTRO Premier Hotel) - Skyline Bayview	5	\$350	4 Blocks
Hotel Abri	6	\$249	4 Blocks
Hotel Monaco (a Kimpton property)	7	\$299	6 Blocks
Hotel Nikko San Francisco	8	\$309	4 Blocks
Hotel Palomar (a Kimpton property)	9	\$319	2 Blocks
Hotel Triton (a Kimpton property)	10	\$ 259	8 Blocks
Intercontinental San Francisco	11	\$324	1 Block
JW Marriott San Francisco Union Square	12	\$325	6 Blocks
Marriott Marquis San Francisco (ASTRO Headquarter and Premier Hotel) ★	13	\$349	1 Block
Marriott Union Square San Francisco	14	\$305	5 Blocks
Mosser Hotel, The	15	\$189	1 Block
Palace Hotel, A Luxury Collection Hotel	16	\$319	3 Blocks
Parc 55 Wyndham San Francisco	17	\$289	3 Blocks
Prescott Hotel (a Kimpton property)	19	\$ 269	9 blocks
Serrano Hotel San Francisco	20	\$269	6 Blocks
Sir Francis Drake Hotel (a Kimpton property)	21	\$299	8 Blocks
St. Regis Hotel San Francisco	22	\$435	1 Block
Villa Florence Hotel	23	\$269	3 Blocks
W Hotel San Francisco	24	\$335	5 Blocks
Westin San Francisco Market Street	25	\$319	1 Block
Westin St. Francis (ASTRO Premier Hotel)	26	\$299	5 Blocks

★ Headquarter Hotel

*All room rates quoted are for a king or double beds, unless otherwise noted. Rates quoted are for one night and exclude taxes and additional fees.

** Complimentary if registered as a Kimpton In Touch Member.

All ASTRO official hotels are between 13-15 miles from the San Francisco International Airport (SFO).

2014 ASTRO Annual Meeting Award Recipients

ASTRO has selected 43 researchers to receive the 2014 Annual Meeting Abstract Awards. These individual grants, totaling \$35,500 in funding, recognize the top-rated abstracts in seven categories and showcase the high quality of research from around the world that is presented at ASTRO's Annual Meeting, in addition to demonstrating ASTRO's continued commitment to promoting and advancing cancer research. The winners will receive the honor during ASTRO's 56th Annual Meeting in San Francisco. For more information about each award, visit www.astro.org/AbstractAwards.

RESIDENT CLINICAL/BASIC SCIENCE RESEARCH AWARD

Andrew Sharabi, MD, PhD (Radiation and Cancer Biology)
Madhu Sudhan Reddy Gudur, PhD (Radiation Physics)
Stephanie Markovina, MD, PhD (Clinical)

RESIDENT DIGITAL POSTER RECOGNITION AWARD

Pranshu Mohindra, MD (Radiation and Cancer Biology)
Adam Gladwish, MD (Radiation Physics)
Kim Cao, MD (Clinical)

RESIDENT POSTER VIEWING RECOGNITION AWARD

Clinical

Steven Szkolnik, MD (1st place)
Jessica Zhou, MD (2nd place)
Thomas Mullen, MD, PhD (3rd place)

Radiation and Cancer Biology

Nils Nicolay, MD, PhD (1st place)
Kate Barrett, MD (2nd place)
Chi Zhang, MD, PhD (3rd place)

Radiation Physics

Paul Romesser, MD (1st place)
Roohi Gupta, PhD (2nd place)
Ziad Simon Fawaz, MD (3rd place)

BASIC SCIENCE ABSTRACT AWARD

Radiation Physics

Ganiyu Asuni, PhD
Jeremy Booth, PhD
Fiona Hegi-Johnson, MBBS
Xia Li, PhD
Yana Zlateva, MS

Radiation and Cancer Biology

Masayuki Matsuo, MD, PhD
Everett Moding, BS
Ngoc Pham, BS
Corey Speers, MD, PhD
Daniel Spratt, MD, BS

ANNUAL MEETING TRAVEL AWARD

Radiation Physics

Olivia Kelada, MS, BS
Yilin Liu, PhD
Jan Schuemann, PhD
Almut Troeller, MS
Stephen Yip, PhD

Radiation and Cancer Biology

Miran Blanchard, MD
Nevine Hanna, MD, MPH
Amanda Walker, MD
Christopher Wright, BS
Zachary Zumsteg, MD

Clinical

Kamran Ahmed, MD
Ben Creelan, MD
Clement Ho, MD, MS
Anthony Paravati, MD, MBA
John Vargo, MD

INTERNATIONAL – U.S. ANNUAL MEETING SCIENTIFIC ABSTRACT AWARD

Yun Chiang, MD

ANNUAL MEETING NURSE ABSTRACT AWARD

Chiaki Fujioka, RN
Diane Serra, MS, RN



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ASTRO elects new leadership

Four new officers have been elected to serve on ASTRO's Board of Directors, and three members have been elected to serve on ASTRO's Nominating Committee. The new officers' terms will begin at the Annual Business Meeting at ASTRO's 56th Annual Meeting in San Francisco. For more information, visit www.astro.org/vote.

The new Board of Directors members are:



President-elect

DAVID C. BEYER, MD, FASTRO, Arizona Oncology Services, Scottsdale, Arizona



Clinical Affairs and Quality Council Vice-chair

JAMES A. HAYMAN, MD, MBA, University of Michigan, Ann Arbor, Michigan

Education Council Vice-chair

STEPHEN M. HAHN, MD, FASTRO, University of Pennsylvania, Philadelphia

Government Relations Council Vice-chair

SAMEER R. KEOLE, MD, Mayo Clinic, Phoenix

The new Nominating Committee members are:



Nominating Committee Academic Physician

WILLIAM M. MENDENHALL, MD, University of Florida, Gainesville, Florida

Nominating Committee Community Practice Physician

PATRICIA HARDENBERGH, MD, Shaw Regional Cancer Center, Edwards, Colorado

Nominating Committee Radiobiologist

KATHRYN HELD, PHD, Massachusetts General Hospital, Boston

2014 ANNUAL MEETING UNRESTRICTED EDUCATIONAL GRANT SUPPORTERS

(As of July 11, 2014)

Bayer HealthCare
Lilly
Merck
Pfizer

Internationally renowned surgeon receives Honorary Membership

BY BRITTANY ASHCROFT, COMMUNICATIONS MANAGER, BRITTANYA@ASTRO.ORG

Angelita Habr-Gama, MD, PhD, an internationally renowned surgeon, has been selected as ASTRO's 2014 Honorary Member.

Dr. Habr-Gama will receive this honor during the Awards Ceremony at ASTRO's 56th Annual Meeting on Tuesday, September 16 at 10:15 a.m. in the Esplanade Ballroom at Moscone Center in San Francisco.

Honorary Membership is the highest honor ASTRO awards to distinguished cancer researchers and leaders in disciplines other than radiation oncology, radiobiology and radiation physics. Candidates must be nominated by one Active member of ASTRO and receive letters of support from two additional Active members. One individual is selected each year for Honorary Membership by ASTRO's Board of Directors.

Dr. Habr-Gama, professor of surgery at the University of Sao Paulo School of Medicine and staff surgeon of colorectal surgery at Hospital Alemao Oswaldo Cruz in Sao Paulo, Brazil, is internationally recognized for her work in developing and promoting selective nonoperative treatment approaches for rectal cancer.

In the late 1980s, Dr. Habr-Gama discovered that patients with rectal cancer who had received neoadjuvant chemoradiation therapy did not have residual cancer but were still undergoing abdominal perineal resections.

"When we discovered this, I could not offer this operation anymore without at least a suspicion that the tumor was still there and without a thorough discussion with the patient," she said. "This led us to start reassessment of response eight weeks after completion of chemoradiation therapy instead of immediately scheduling an operation. When I started reassessing these patients, I realized that some tumors actually completely disappeared on clinical evaluation."

This assessment led to Dr. Habr-Gama's landmark paper, "Operative versus nonoperative treatment for stage 0 distal rectal cancer following chemoradiation therapy: long-term results," published in *Annals of Surgery* in October 2004. Her group's research showed a 100 percent five-year overall survival rate and complete clinical response of the primary tumor in patients with locally advanced rectal cancer treated with chemoradiation therapy and managed only with observation. Two patients experienced local



failures; however, they were successfully managed without radical resection. This strategy avoids the surgery that has been the standard of care for this disease.

"This approach has been criticized for years. All of the downsides and potential harms have been pointed out, and we have worked hard to demonstrate that, in experienced hands, this is a safe and valid alternative that has to be considered individually for each patient," she said.

Dr. Habr-Gama has written several opinion pieces explaining the benefit of preoperative radiation for rectal cancer, encouraging investigators to reconsider


before marginalizing radiation from the standard treatment of rectal cancer.

"Many people outside of Latin America thought I was a radiation oncologist," she said. "I am a big proponent of preoperative radiation because I know it works and because our fantastic group of radiation oncologists have made us comfortable with the process and have delivered treatment with very low complication rates."

Dr. Habr-Gama believes that her research will eventually impact treatment approaches for rectal cancer, both in the United States and internationally.

"Our research on this approach has provided a considerable amount of evidence to suggest that select patients with complete clinical response to neoadjuvant chemoradiation therapy may be safely spared from immediate radical surgery. There is indication that there will be trials in the United States using this treatment strategy," she said. "This represents a significant change in the surgical, medical and radiation oncology community and will allow a more robust understanding of the role of 'watch and wait' for the management of selected patients with rectal cancer."

Dr. Habr-Gama is grateful for the recognition from the radiation oncology community of her work and research to benefit cancer patients.

"This award confirms that all of the effort, hard work and perseverance in pursuing this treatment strategy for the sole benefit of patients with rectal cancer have been valuable," she said. "It takes time to implement changes in medicine and in people's minds. I feel truly rewarded to see it happening in front of me." 

Three accomplished physicians awarded ASTRO's Gold Medal

BY BRITTANY ASHCROFT, COMMUNICATIONS MANAGER, BRITTANYA@ASTRO.ORG

ASTRO has selected Mary K. Gospodarowicz, MD, FASTRO, Leonard L. Gunderson, MD, MS, FASTRO, and Nancy J. Tarbell, MD, FASTRO, to receive the Society's highest honor—the ASTRO Gold Medal. The 2014 awardees will receive the ASTRO Gold Medal during the Awards Ceremony on Tuesday, September 16, 2014, at ASTRO's 56th Annual Meeting, September 14-17, 2014, at Moscone Center in San Francisco.

ASTRO's Gold Medal, first awarded in 1977, is bestowed annually on esteemed ASTRO members who have made exceptional contributions to the field of radiation oncology, including work in research, clinical care, teaching and service. Nominees may be from any of the scientific

disciplines represented in ASTRO's membership, including radiation oncology, biology and physics. Including the three 2014 awardees, only 75 of ASTRO's more than 10,000 members have received the Gold Medal.

"Congratulations to my distinguished colleagues, Drs. Gospodarowicz, Gunderson and Tarbell for being recognized with the ASTRO Gold Medal," said ASTRO Chair Colleen A.F. Lawton, MD, FASTRO. "They have each greatly impacted the field of radiation oncology through their research, clinical work and passion for providing high-quality care. Their contributions to our specialty will continue to improve the lives of cancer patients worldwide."

Mary K. Gospodarowicz, MD, FASTRO

Dr. Gospodarowicz is a radiation oncologist and a 33-year ASTRO member who has had a major impact on several areas of radiation oncology, including the treatment of malignant lymphomas and genitourinary cancers, global health and the use of radiation treatment worldwide, and the mentoring of trainees.

"Throughout my career and my roles as clinician, researcher, teacher, administrator and leader, I have focused on promoting radiation therapy as an integral tool for treating cancer patients worldwide," she said.

Dr. Gospodarowicz's research has focused on radiation therapy for lymphomas and genitourinary cancers, as well as studies of secondary cancers and other late effects of treatment. Dr. Gospodarowicz and her colleagues at the Princess Margaret Cancer Centre pioneered systematic studies of surveillance in place of routine use of abdominal and thoracic radiation for early-stage seminoma. This change has helped reduce the risk of these patients developing complications and the risk of secondary cancer.

In addition to her research, Dr. Gospodarowicz's more recent work has focused on global health and the role of radiation therapy in treating cancer patients worldwide. She is currently the president of the Union for International Cancer Control (UICC), an international organization



dedicated to helping reduce the worldwide cancer burden, promoting greater equity in cancer control, and placing cancer on the global health and development agenda. In this role, Dr. Gospodarowicz created the Global Task Force on Radiotherapy for Cancer Control (GTFRCC) to determine what it would take to close the gap between what exists today and equitable access to radiotherapy for cancer globally.

"I have been struck by the fact that radiation oncology has little presence in global health and the global cancer arena," she said. "The goal of the GTFRCC is to

put radiation therapy in the forefront as an essential cancer treatment modality. We want to inform the world that radiation therapy is an extremely useful treatment that can cure a large number of patients and palliate many."

Throughout her career, Dr. Gospodarowicz has mentored trainees and young professionals in the field, emphasizing both clinical and leadership skills. She has also helped develop research masters and doctoral tracks for radiation therapists within the University of Toronto's Department of Radiation Oncology. Dr. Gospodarowicz is the medical director of the Princess Margaret Cancer Centre at the University Health Network in Toronto and the regional vice-president of Cancer Care Ontario.

Leonard L. Gunderson, MD, MS, FASTRO

As a 38-year ASTRO member and former Chair of ASTRO's Board of Directors, Dr. Gunderson has made significant contributions to radiation oncology through research and clinical practice in gastrointestinal (GI) cancers, as well as his dedication to numerous ASTRO committees and his nine years serving on ASTRO's Board of Directors.

"I have had the fortunate opportunity to conduct clinical research and to accomplish scholarly contributions in the area of GI cancers and soft tissue sarcomas that have significantly impacted patient care," Dr. Gunderson said.

In the 1970s, Dr. Gunderson published a definitive study in *Cancer* on the relapse patterns found by second-look surgery in patients treated for rectal cancer. The analysis of this study led to radiation oncologists tailoring radiation fields to the particular sites where disease did recur, rather than estimating where the risk existed. This study, along with his similar study on gastric cancer, still holds influence today—radiation oncology textbooks today still use many of the diagrams from Dr. Gunderson's study to help define radiation therapy field arrangements and protocols for GI cancers.



His additional research has focused on defining the indications for and results of external beam irradiation as a component of multi-modality treatment alone or in conjunction with systemic therapy, with or without surgical resection, for GI cancers and soft tissue sarcomas. He is the senior editor/co-editor of three leading oncology textbooks: *Cancer of the Colon, Rectum and Anus* (first edition), *Intraoperative Irradiation: Techniques and Results* (first and second editions) and *Clinical Radiation Oncology* (first, second and third editions, with a fourth edition pending publication).

Dr. Gunderson has held many positions within ASTRO including service on the Annual Meeting Scientific Committee, Bylaws Committee, Annual Meeting Steering Committee, and Finance and Audit Committee. He was a member of ASTRO's Board of Directors from 2003-2008 and 2009-2013, first as secretary/treasurer (2003-2008), and then as president-elect (2009-2010), president (2010-2011), chair (2011-2012) and immediate past chair (2012-2013).

"It has been a privilege and an opportunity to

Continued on Page 64

Nancy J. Tarbell, MD, FASTRO

Dr. Tarbell, a radiation oncologist and 29-year ASTRO member, has had a major influence on pediatric oncology and radiation therapy, specializing in pediatric brain tumors, and has worked to expand the role of women faculty in radiation oncology and beyond.

"I feel fortunate to be able to take care of children with cancer, and I am proud of the multidisciplinary team approach, which has included medical physicists, biologists and clinicians who provided me with the opportunity to help improve the treatment of children with cancer," she said.

An internationally recognized expert in pediatric oncology, Dr. Tarbell's research has examined ways to provide curative treatment programs for children with malignant disease and to develop effective strategies to decrease the



late effects of treatment. For more than 20 years, Dr. Tarbell has been an active member of the Brain Tumor Committee of the Children's Oncology Group and served as the principal investigator on medulloblastoma protocols. She is credited with establishing the current standard of care for children with high-risk medulloblastoma.

More recently, her research has focused on the use of proton beam therapy in pediatric brain tumors and sarcomas. She is the co-author of the medical textbook *Pediatric Radiation Oncology*, now in its fifth edition, and is a member of the Institute of Medicine

of the National Academies of Science.

Dr. Tarbell has also dedicated her career to fostering the growth of students, residents, fellows and faculty in radia-

Continued on Page 64

Thirty ASTRO members awarded Fellow designation

Thirty distinguished members have been selected to receive the ASTRO Fellow designation. The 2014 class of Fellows will receive the recognition during the Awards Ceremony at ASTRO's 56th Annual Meeting on Tuesday, September 16 at 10:15 a.m. in the Esplanade Ballroom at Moscone Center in San Francisco.

The Fellows Program, started in 2006, honors those who have been an Active or Emeritus member of ASTRO for at least 15 years, have given the equivalent of 10 years of service to ASTRO and have made significant contributions to the field of radiation oncology in the areas of research, education, patient care or service and leadership. Including the 2014 class of Fellows, 242 ASTRO members have received the FASTRO designation.

Candidates must be nominated by a current ASTRO Fellow, accompanied by three letters of support from a selected subset of ASTRO members, which includes past or present members of ASTRO's Board of Directors, ASTRO Gold Medalists, ASTRO Fellows and former or current departmental chairs. A 10-member Fellows Selection Committee reviewed all of the nominations and presented a slate of recommended Fellows to ASTRO's Board of Directors for final approval.

The members of the 2014 Fellows class are:

- John M. Buatti, MD, *University of Iowa, Iowa City, Iowa*
- Thomas F. Delaney, MD, *Massachusetts General Hospital, Boston*
- Adam Dicker, MD, PhD, *Thomas Jefferson University, Philadelphia*
- Avraham Eisbruch, MD, *University of Michigan, Ann Arbor, Michigan*

- Eduardo Fernandez, MD, PhD, *21st Century Oncology, Plantation, Florida*
- David Gaffney, MD, PhD, *University of Utah, Salt Lake City*
- Adam S. Garden, MD, *MD Anderson Cancer Center, Houston*
- Katherine L. Griem, MD, *Rush University Medical Center, Chicago*
- William Hartsell, MD, *CDH Proton Center, Warrenville, Illinois*
- James Alan Hayman, MD, MBA, *University of Michigan, Ann Arbor, Michigan*
- I-Chow Joe Hsu, MD, *University of California, San Francisco*
- Lisa Kachnic, MD, *Boston Medical Center, Boston*
- Brian Kavanagh, MD, MPH, *University of Colorado, Aurora, Colorado*
- Timothy Kinsella, MD, MS, MA, *Warren Alpert Medical School of Brown University, Providence, Rhode Island*
- Andre Konski, MD, MBA, MA, *University of Pennsylvania, West Chester, Pennsylvania*
- Patrick Kupelian, MD, *University of California, Los Angeles*
- Quynh-Thu Le, *Stanford University, Stanford, California*
- W. Robert Lee, MD, MS, MEd, *Duke University School of Medicine, Durham, North Carolina*
- Stephen Lutz, MD, *Blanchard Valley Regional Cancer Center, Findlay, Ohio*
- Chang Ming Charlie Ma, PhD, *Fox Chase Cancer Center, Philadelphia*
- Bruce D. Minsky, MD, *MD Anderson Cancer Center, Houston*
- Najeeb Mohideen, MD, *Northwest Community Hospital, Arlington Heights, Illinois*
- Simon N. Powell, MD, PhD, *Memorial Sloan Kettering Cancer Center, New York*
- Mack Roach III, MD, *University of California, San Francisco*
- Kenneth E. Rosenzweig, MD, *Icahn School of Medicine at Mount Sinai, New York*
- Christopher J. Schultz, MD, *Medical College of Wisconsin, Milwaukee*
- Dennis Shrieve, MD, PhD, *University of Utah, Salt Lake City*
- Paul W. Sperduto, MD, MPP, *Minneapolis Radiation Oncology, Waconia, Minnesota*
- Maria Werner-Wasik, MD, *Thomas Jefferson University Hospital, Philadelphia*
- Jeffrey F. Williamson, PhD, *Virginia Commonwealth University Medical Center, Richmond, Virginia* 



2013 CLASS OF ASTRO FELLOWS

Annual Report | 2013



PHILLIP M. DEVLIN, MD, FASTRO
ASTRO Secretary/Treasurer

TREASURER'S REPORT

I'm pleased to report that 2013 was another financially successful year for ASTRO. ASTRO's active management philosophy again led to strong financial returns in the long-term investment portfolio. This has had the direct effect to allow ASTRO to reinvest funds in new initiatives and continue to be the leader in education, research and advocacy for radiation oncology and the patients we serve.

In April 2014, independent auditors, Squire, Lemkin and Company LLP, conducted an audit of ASTRO's 2013 financial statements. The auditors expressed an unqualified "clean opinion," the highest opinion available. ASTRO's Finance/Audit Committee, which meets regularly to discuss financial matters and ensures the best value for ASTRO's financial resources, reviewed the report in detail with the auditors. ASTRO's Board of Directors approved the audit in June 2014.

PROFIT AND LOSS STATEMENT

ASTRO's individual and corporate membership dues represent 21 percent of the total 2013 operating revenue (\$16.1 million). Other major revenue sources include the Annual Meeting at 51 percent and journal royalties at 10 percent. ASTRO had a \$1.9 million loss from operating activities for the year, as the organization invested significantly in new initiatives. With a tactical tilt toward equities and away from fixed income, ASTRO's investment portfolio appreciated by \$4.3 million or 16.21 percent. This resulted in a net gain of \$2.2 million for a year that was filled with excellent new initiatives.

BALANCE SHEET

As of December 31, 2013, ASTRO has a strong financial position with \$37.2 million in assets and \$5.5 million in liabilities. Investments (\$31.3 million) make up the majority of ASTRO's assets. Deferred revenue (\$3.5 million) makes up the majority of ASTRO's liabilities, which has increased as members take advantage of ASTRO's multi-year membership dues payment options.

In 2013, ASTRO's Board of Directors designated a significant portion of reserves to be reinvested into critical programs, such as the ROI Campaign Matching Program, APEX: Accreditation Program for Excellence and RO-ILD: Radiation Oncology Incident Learning System. As of December 31, 2013, the balance of those designated reserves was \$12.8 million.

ASTRO continues to focus on current and long-term financial planning, making the necessary adjustments to meet the goals of the strategic plan to better serve members of the organization, the specialty and cancer patients worldwide. I am pleased to report that ASTRO's accounts, as of December 31, 2013, remain well controlled and actively monitored. Our well-managed investment portfolio puts ASTRO in a strong position for the future. We continue to be superbly supported in this work by the expertise of ASTRO's Vice-president of Finance and Administration Terry Karras and his dedicated team.

It has been a privilege and a pleasure serving as ASTRO's Secretary/Treasurer for the past four years. I happily and confidently pass this responsibility to Jeff Michalski, MD, FASTRO, who will continue to ensure ASTRO's financial health and take us to even greater heights.

Phillip M. Devlin, MD, FASTRO

ASTRO Secretary/Treasurer

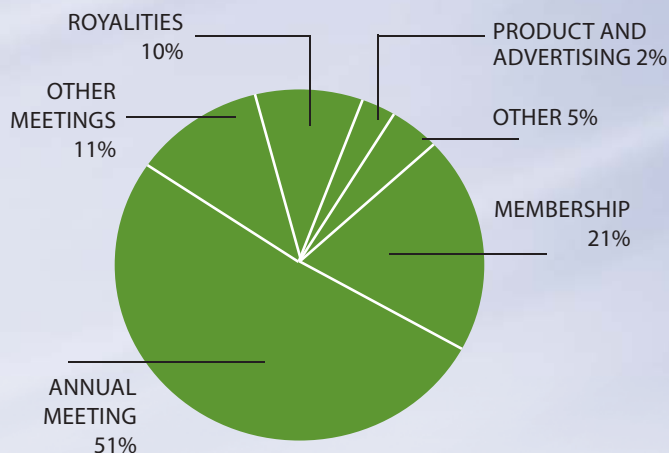


JEFF MICHALSKI, MD, FASTRO
ASTRO Secretary/Treasurer-elect

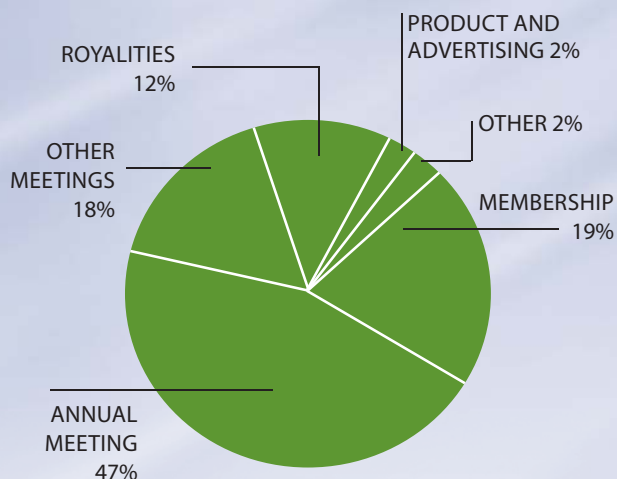
	DECEMBER 31,	
	2013	2012
ASSETS:		
Cash and cash equivalents	2,414,184	2,757,048
Certificates of deposit	2,529,693	3,762,739
Long-term investments (and percentage allocation)		
Large Cap Equity	10,097,504 35%	8,649,943 35%
Small Cap Equity	2,002,968 7%	1,502,964 6%
International Equity	6,460,552 22%	4,986,757 20%
Intermediate Fixed Income	5,876,343 20%	5,984,239 24%
Alternatives	4,315,111 15%	3,715,759 15%
Accounts receivable	679,146	766,546
Due from Affiliate	831,936	546,865
Prepaid expenses	466,139	367,091
TOTAL CURRENT ASSETS	<u>\$35,673,574</u>	<u>\$33,039,951</u>
PROPERTY AND EQUIPMENT, NET:	<u>\$1,166,684</u>	<u>\$1,505,024</u>
OTHER ASSETS:		
Investments - deferred compensation	233,412	-
Deposits	84,422	22,575
TOTAL OTHER ASSETS	<u>\$317,834</u>	<u>\$22,575</u>
TOTAL ASSETS	<u><u>\$37,158,092</u></u>	<u><u>\$34,567,550</u></u>
LIABILITIES AND NET ASSETS		
CURRENT LIABILITIES:		
Accounts payable	637,824	1,324,312
Accrued salaries	930,714	835,607
Deferred rent, current	70,799	58,738
Deferred revenue	3,246,988	2,348,567
Due to Affiliate(s)	120	329,204
TOTAL CURRENT LIABILITIES	<u>\$4,886,445</u>	<u>\$4,896,428</u>
LONG TERM LIABILITIES:		
Deferred compensation	233,412	-
Deferred revenue, non-current	287,198	-
Deferred rent, non-current	128,690	202,037
TOTAL LONG TERM LIABILITIES	<u>\$649,300</u>	<u>\$202,037</u>
TOTAL LIABILITIES	<u><u>\$5,535,745</u></u>	<u><u>\$5,098,465</u></u>
NET ASSETS:		
Unrestricted		
Undesignated	18,838,071	22,845,051
Board designated - program	12,784,276	6,624,034
TOTAL NET ASSETS	<u>\$31,622,347</u>	<u>\$29,469,085</u>
TOTAL LIABILITIES AND NET ASSETS	<u><u>\$37,158,092</u></u>	<u><u>\$34,567,550</u></u>

	FOR YEARS ENDED DECEMBER 31,	
	2013	2012
REVENUE AND SUPPORT:		
MEMBERSHIP	\$3,312,343	\$3,264,333
MEETINGS		
Annual meeting	8,149,269	8,379,484
Other meetings	1,816,846	3,245,755
Total Meetings	\$9,966,115	\$11,625,239
OTHER		
Royalties	1,632,919	2,135,316
Products	136,472	140,352
Advertising	175,393	191,346
Other	880,175	347,049
Total Other	\$2,824,959	\$2,814,063
TOTAL REVENUE AND SUPPORT	\$16,103,417	\$17,703,635
EXPENSES:		
MEETINGS		
Annual meeting	4,012,644	3,802,886
Other meetings	2,074,918	3,069,503
Meetings and Education Support	468,258	584,442
Total Meetings	\$6,555,820	\$7,456,831
COMMITTEES	\$698,515	\$782,513
PROGRAMS		
Advocacy and Clinical Affairs	4,493,194	3,499,116
Communications	581,593	443,985
Public Awareness Campaign	186,194	119,445
Corporate Relations	181,631	106,925
Total Programs	\$5,442,612	\$4,169,471
SUPPORTING SERVICES		
Administration and Executive	795,764	798,509
Membership	1,717,538	1,608,049
Information Technology	829,292	1,140,197
Finance	1,034,753	996,888
Human Resources	319,348	313,271
Board of Directors	641,817	585,208
Total Supporting services	\$5,338,512	\$5,442,122
TOTAL EXPENSES	\$18,035,459	\$17,850,937
PROFIT/(LOSS) FROM OPERATIONS	\$(1,932,042)	\$(147,302)
INVESTMENT INCOME/(LOSS)	4,377,609	2,903,271
ROI Pledge Matching Program	(292,305)	(825,358)
PROFIT/(LOSS)	\$2,153,262	\$1,930,611

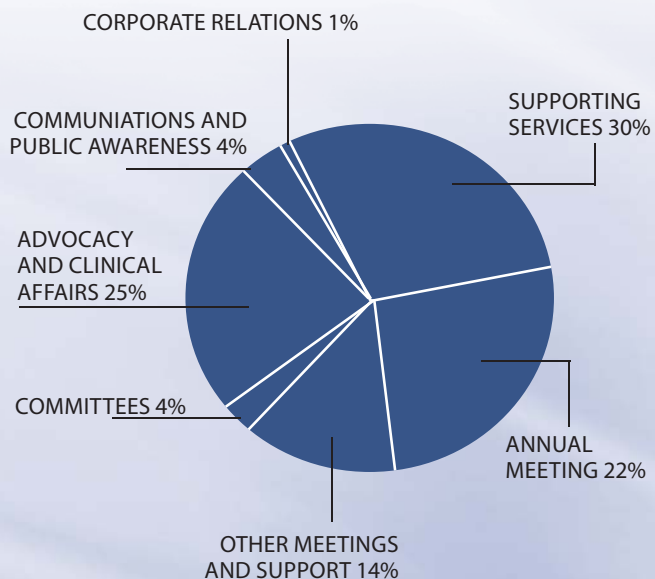
2013 Revenue



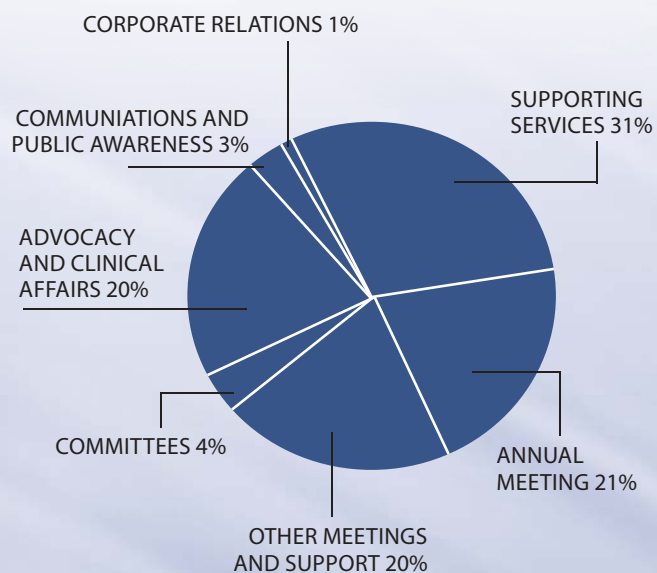
2012 Revenue



2013 Expenses



2012 Expenses



ASTRO SELECTS SEVEN RESEARCHERS TO RECEIVE A TOTAL OF \$675,000 IN GRANTS AND AWARDS

The Junior Faculty Career Research Training Award provides \$200,000 to two recipients (\$100,000 annually for two years) to help develop the careers of promising junior faculty by allowing them dedicated time to work on research projects in radiation oncology, biology, physics or outcomes/health services.

BRYAN ALLEN, MD, PHD

University of Iowa Hospitals and Clinics, Iowa City, Iowa

Research Title: Pharmacological Ascorbate Enhances Non-small Cell Lung Cancer Sensitivity to Radiation and Chemotherapy

New adjuvant treatments in lung cancer that increase cancer therapy efficacy without causing excessive added patient toxicity are urgently needed. One potential approach with minimal toxicity that exploits fundamental differences in oxidative metabolism between cancer cells and normal cells is pharmacological ascorbate. Pharmacological ascorbate induces the formation of hydrogen peroxide via an autoxidation reaction catalyzed by redox active metal ions such as iron and copper. We hypothesize that cancer cells have higher concentrations of labile redox active metal ions due to increased steady-state levels of superoxide that will selectively enhance chemoradiation sensitivity in lung cancer cells (versus normal bronchial epithelial cells) by increasing hydrogen peroxide mediated oxidative stress.

In aim one, we will determine if pharmacological ascorbate enhances non-small cell lung cancer chemoradiation sensitivity *in vitro* by a mechanism mediated by metal ion catalyzed

H₂O₂-induced oxidative stress. In aim two, we will extend these observations to *in vivo* xenograft models to determine if pharmacological ascorbate can be used to modulate chemoradiation sensitivity via oxidative stress.

STEPHEN SHIAO, MD, PHD

Cedars-Sinai Medical Center, Los Angeles

Research Title: The Impact of Macrophage Polarization on the Efficacy of Radiation Therapy

Recent studies have demonstrated a critical role for the immune system in determining the response of tumors to radiation therapy (RT). Multiple studies have identified macrophages as key cells that regulate the immune response in tumors following RT. Macrophages have multiple different phenotypes that can either support or suppress an ongoing immune response, and our preliminary data suggests that targeting a cytokine, interleukin(IL)-4 that controls the development of macrophages that suppress an ongoing immune response enhances the efficacy of RT. The objective of this research proposal is to address the mechanism(s) by which IL-4 blockade enhances the response to RT.

The proposal tests the hypothesis that macrophage phenotype regulates RT-induced immune responses and

Bryan Allen, MD, PhD



Stephen Shiao, MD, PhD

that the efficacy of RT can be enhanced *in vivo* by IL-4 blockade. To evaluate this hypothesis, the following aims are proposed. Aim one: Characterize the effect of IL-4 blockade combined with RT on intra-tumor immune responses in a murine model of breast cancer; and Aim two: Define mechanism(s) of IL-4-regulation of RT responses in a murine model of breast cancer. We will accomplish these aims using focal RT in a murine model of breast cancer and studying the effects of RT and IL-4 blockade using a combination of flow cytometry, immunohistochemistry, quantitative PCR and ELISA to determine the changes in the immune profile of tumors.

Continued on Page 56

Zachary Morris, MD, PhD



Tu Dan, MD

Todd Aguilera, MD, PhD



The ASTRO Resident/Fellows in Radiation Oncology Research Seed Grant offers \$25,000 to residents and fellows hoping to pursue careers in basic science or clinical research to support carrying out a pilot project related to radiation treatment. Three awards will be presented this year.

mune response, we hypothesize that a therapeutic approach combining radiation, tumor-specific ADCC and a T cell checkpoint inhibitor may synergize to augment local, systemic and memory anti-tumor immune responses. Using a syngeneic mouse model of melanoma, we will test this hypothesis *in vivo* by comparing the efficacy of combinations of radiation, a tumor specific antibody that elicits ADCC and a checkpoint inhibitor with respect to the control of local, distant (non-radiated) and re-introduced sites of disease. Using flow cytometry and immunofluorescence microscopy, we will quantitatively and qualitatively evaluate the immune response generated by these treatments.

Recent data has implicated the role of oncogenic microRNAs in driving treatment resistance. miR-21, in particular, has been found to be up-regulated in more than 18 major cancer types and has been linked to radiation and chemotherapy resistance. It is associated with genes involved in DNA repair, cell cycle redistribution, tumor hypoxia, and has been experimentally found to target known tumor suppressors.

We hypothesize that miR-21 up-regulation drives radiation resistance in breast cancers via alterations in the cohesin complex. Inhibition of miR-21 may be a novel approach to overcome treatment resistance and sensitize tumors to DNA-damaging agents.

ZACHARY MORRIS, MD, PHD

University of Wisconsin Hospitals and Clinics, Madison, Wisconsin

Research Title: Engaging Antibody Dependent Cell-mediated Cytotoxicity to Augment the Synergy of Radiation and T cell Checkpoint Inhibition

A growing body of evidence suggests radiation may compliment immunotherapies by enhancing the immune susceptibility of tumor cells and generating tumor-specific antigens. We have been investigating the synergy of radiation and antibody-dependent cell-mediated cytotoxicity (ADCC) in a syngeneic murine model of melanoma. In these studies we have observed therapeutic cooperation of radiation and ADCC with respect to local tumor control without clear evidence of a systemic or memory T cell response.

Given the complementary roles of the innate and adaptive immune system as well as the critical role of innate immune cells in priming adaptive im-

TU DAN, MD

Thomas Jefferson University, Philadelphia

Research Title: The role of miR-21 in Breast Cancer Progression and Sensitivity to Cytotoxic Therapy

While the majority of breast cancer patients have favorable outcomes, there is a subset of women with disease resistant to standard treatments. These tumors are often associated with basal-like gene expression and triple negative receptor status. Triple negative breast cancers (TNBC) have been found to have similar features as BRCA-defective tumors, leading to similar use of targeted therapies exploiting existing DNA-repair defects in this population. However, although successful in BRCA-mutated cancers, clinical studies targeting DNA repair pathways have been equivocal in TNBCs, leading some to believe that these cancers may be more resistant to DNA damage than previously thought.

TODD AGUILERA, MD, PHD

Stanford University Cancer Center, Stanford, California

Research Title: The Role of Radiation in Adaptive Immune Resistance and *de novo* Anti-tumor Immune Response

In recent years, much has been learned about tumor associated antigens that the immune system uses to distinguish tumor cells and how the immune system can be activated to respond to cancer. This project aims to investigate reasons why in the setting of checkpoint blockade tumor immunity often does not occur.

It is hypothesized that radiation can play an important synergistic role in the setting of checkpoint blockade to enhance responses through increasing antigen presentation and altering immunosuppressive tumor lymphocytes. This study will also evaluate the Abscopal Effect of radiation that when combined with immune checkpoint

blockade can lead to immune responses to untreated tumors. There is need to validate the mechanistic hypotheses for these phenomena and apply them to poorly immunogenic tumors with the goal of developing a therapeutic regimen that can impact a broader number of cancers than currently capable with

mono therapy. This study will evaluate how PD-1 inhibition synergizes with radiation. It will explore methodologies that exploit the emerging hypotheses of adaptive immune resistance and de novo anti-tumor response. Tumors that respond to checkpoint inhibition alone by expressing tumor antigen will

be compared with poorly immunogenic tumors, and new combination approaches that include radiation will be explored. This proposal aims to unveil important aspects of tumor immunity allowing a greater impact of immune checkpoint targeted therapeutics.

The ASTRO/ROI Comparative Effectiveness Research Award provides \$100,000 to two recipients (\$50,000 annually for two years) who will conduct comparative effectiveness research within radiation oncology.

BENJAMIN SMITH, MD

MD Anderson Cancer Center, Houston

Research Title: Population-based Comparison of Quality of Life Outcomes Following Four Local Therapy Strategies for Early Breast Cancer

For older women with localized, estrogen receptor (ER) positive breast cancer, at least four local therapy treatment strategies are acceptable: lumpectomy with whole breast irradiation, lumpectomy with brachytherapy, mastectomy without radiation and lumpectomy with endocrine therapy alone. Yet these strategies differ with regard to their risk of local recurrence and side effect profile. Further, guidelines do not discriminate as to which option may be best for a particular older patient given her baseline medical and social issues. To truly personalize decision making, there is a critical need to elucidate the impact of local therapy specifically on quality of life (QoL) as experienced and reported by the patient herself.

We hypothesize that lumpectomy followed by whole breast radiation is the local therapy that confers the best impact on long-term QoL and lowest level of decisional regret for older women with early, ER+ breast cancer. To test our hypothesis, we will build on our prior experience with Medicare claims to conduct a population-based survey of 1,248 older Medicare beneficiaries diagnosed with breast

cancer in 2009 and treated with one of four local therapy options. We will use validated instruments to determine the overall positive and negative impact of local therapy on QoL and the specific impact of local therapy on body image, functional status, breast pain and cosmetic outcome. We will also assess decisional regret regarding the patient's chosen local therapy. Multivariate regression analyses adjusted for baseline patient characteristics will evaluate the contribution of local therapy to these patient-oriented, QoL outcomes.

JAMES MURPHY, MD, MS

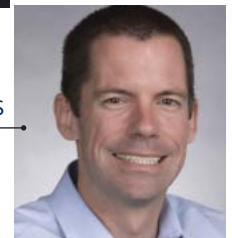
University of California San Diego, San Diego

Research Title: Hypofractionated Radiation for Breast Cancer Across the U.S.: A Patterns of Care and Comparative Effectiveness Study

Breast conservation surgery followed by radiation represents an important treatment option in early stage breast cancer. The standard course of breast radiation includes daily treatments extending over five to six weeks. Over the past decade, mature, large, international randomized clinical trials from Canada and the UK in early stage breast cancer patients have found similar outcomes between conventional radiation extending over five weeks and shorter hypofractionated radiation courses extending over three weeks. Despite clear data supporting the



Benjamin Smith, MD



James Murphy, MD, MS

efficacy of hypofractionated radiation, anecdotal evidence suggests limited use in current clinical practice. Ultimately, the true rates of acceptance and integration of hypofractionated radiation within the U.S. remains unknown. The purpose of this study is to define the real-world use of radiation therapy in an elderly population of breast cancer patients across the U.S.

The specific aims of this study are: 1) To define patterns of hypofractionated breast radiation between 1999 and 2012; 2) To study the comparative effectiveness of hypofractionated versus standard fractionated radiation; and 3) To identify patient or provider characteristics associated with the use of hypofractionated or standard fractionated radiation therapy.

For more information on these awards, visit www.astro.org/grants.

From the ABR

CMEs, SA-CMEs AND SAMs

CONTINUING MEDICAL EDUCATION (CME) requirements have been an integral part of medical practice for decades, with most state medical licensing boards and hospitals requiring specific levels of Category I and II credits to maintain and/or periodically renew licensure or hospital privileges.

In 1981, the Accreditation Council on Continuing Medical Education (ACCME) was founded by a group of stakeholder organizations committed to high-quality educational programming for physicians (www.accme.org/about-us). Since its founding, ACCME has served as the approving body for CME content providers. Organizations approved by the ACCME to provide Category I content are required to maintain rigorous records for potential audit and periodic re-applications; however, they need not submit individual programs for approval.


During the past decade, based on external forces and internal ACCME policies, there has been an increasing emphasis on CME programming

that includes both educational content and an assessment of the knowledge obtained from that content. From the outset of the American Board of Medical Specialties (ABMS) and ABR Maintenance of Certification (MOC) programs, assessment of knowledge gained in CME programming has been an integral element of MOC Part II, Lifelong Learning and Self-Assessment. The self-assessment CME requirements are unique to MOC programs. Although frequently clarified, they seem to remain confusing to many diplomates, especially regarding the difference between self-assessment CME (SA-CME) and self-assessment modules (SAMs).

When the ABR 10-year cycle MOC program was initially developed, Part II required completion of 250 Category 1 CME credits, including eight SAMs, during the 10-year period. SAMs are educational activities that may be provided in person at loco-regional or national meetings, or online. There may be one or more

presenters, and the ABR requires a minimum of five questions for self-assessment at the completion of the module. Diplomates were concerned that there were insufficient SAMs available to fulfill their Part II needs and that the available modules often did not relate to their personal areas of interest. Therefore, when the MOC program was revised, the self-assessment requirements were broadened to add SA-CME, which includes a variety of enduring content such as journal articles and Web-based instruments with only five self-assessment questions. When the ABR MOC program was revised in 2012 to become a continuous, three-year rolling cycle of Continuous Certification (ConCert), Part II requirements were clarified to specify a total of 75 Category 1 CME credits per three years, to include 25 SA-CME credits.

ASTRO has continued to offer an increasing inventory of both SAMs and SA-CME, and ASTRO will provide 10 SAMs at the 2014 Annual Meeting. Four SAMs were provided at the Spring Refresher Course. SAMs and SA-CMEs are also offered by a variety of professional societies and for-profit entities. ASTRO maintains records of its programs and participants, and transfers credit for participation records directly to the ABR.

ABR diplomates should continue to maintain their own records as a backup and should check their personal ABR account (myABR) periodically at <https://myabr.theabr.org/login> to assure accuracy of reporting. 

During the past decade, based on external forces and internal ACCME policies, there has been an increasing emphasis on CME programming that includes both educational content and an assessment of the knowledge obtained from that content.

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FAILURE MODES AND EFFECT ANALYSIS:

A tool for developing a risk-based quality management program in radiation therapy



M. SAIFUL HUQ, PHD



BRUCE R. THOMADSEN, PHD

FAILURE MODE AND EFFECTS

ANALYSIS (FMEA) is a proactive risk assessment tool used to systematically evaluate and identify risks or weaknesses in product designs or other processes that could lead to mistakes, errors and potential hazardous outcomes and to identify process controls and address them before they result in adverse events.

Although FMEA is an industrial engineering tool for risk management and safety improvement of complex processes, it is now increasingly used in the health care industry to proactively assess and improve the safety of complex health care processes. Particularly in recent years, many studies have shown the benefits of risk-based industrial techniques for safety and quality in medical settings¹⁻⁴. The

field of clinical pharmacy science, for example, has entirely revised its approach to quality management in an attempt to decrease the number of prescription drug mistakes and errors, with impressive results⁴. More recently, the process-oriented and risk-based analysis of emergency room procedures has been a major effort in the field of emergency medicine. The goal of these efforts is to establish an efficient program to maintain or to improve quality in a reasoned and systematic manner. The forthcoming report of Task Group 100 of the American Association of Physicists in Medicine recommends FMEA as the framework of choice for setting up quality management programs in radiotherapy⁵.

Industrial application of FMEA falls into four categories: 1) Design

FMEA, 2) Process FMEA, 3) Application FMEA and 4) Service FMEA. Often, the boundaries between these categories blur, particularly in a heavily procedural-based process. Health care organizations should use Process FMEA to evaluate treatments, procedures and processes and to identify specific process steps at risk to produce sub-optimal or hazardous outcomes. Those areas are then addressed, and more effective quality controls are developed and implemented to improve process performance and overall process quality.

There are various steps that need to be completed to perform a quantitative FMEA. These include the following:

1. Mapping the process steps in a flow diagram (process tree, flow chart or process map). In radiation therapy, an example of process mapping can be "Treatment Planning Anatomy Entry" and a step in this process may be "Delineation of GTV, CTV and other structures."
2. Identification of all (or as many as possible) of the potential failure modes, ways in which a process step could fail to meet its intended purpose, for each process step. Each process step can, and usually does, have several potential failure modes. An example of failure mode for the step mentioned in step 1 above could be "Contouring error."
3. Identification of all of the potential causes of each potential failure mode. Each failure mode can, and usually does, have several causes. Examples of causes of failure for the step and failure mode mentioned in step 2 are

“Lack of standardized procedures” and “Human failure.”

4. Determination of the impact of each potential failure mode on the outcome of the process if the situation in step 3 above is not detected and corrected during subsequent steps. Normally there are three levels of effects for each failure mode:
 - a. Local effect—the effect of the failure mode at the process step level.
 - b. Downstream effect—the effect of the failure mode on the next step downstream from the process step being analyzed.
 - c. End effect—the effect of the failure mode at end point of the overall process being analyzed. Examples of end effects are “wrong dose delivered” or “wrong volume treated.”
5. Identification of existing process controls. There are three basic categories of process controls. These consist of actions that have been taken that attempt to:
 - a. Prevent the occurrence of the cause of a failure mode.
 - b. Detect the failure mode before it produces the end effect.
 - c. Moderate the severity of the results should a failure mode occurs.A peer-review check of all structures delineation would be an example of a control for the potential failure discussed above.
6. Determination of a ranking metric based on the likely untoward outcome of the process step failure. Three independent indices contribute to this determination:
 - a. Occurrence (O)—the likelihood that the cause will occur and result in the potential failure mode.
 - b. Detection (D)—the likelihood that a failure mode will not be

detected, if it occurs, before causing the significant or serious end effects.

- c. Severity (S)—the severity of the end effect for the specific failure mode, given that the failure mode occurs.

Each of the three factors, O, S and D, is ranked on a scale from one to 10, with 10 being the worst-case scenario.
7. Calculation of the risk priority number (RPN) for each failure mode, cause and effect combination. The RPN is the product of the three factors: occurrence, detection and severity ($RPN = O \times S \times D$). High RPNs indicate process weakness or potentially hazardous process steps.
8. Identification of the process steps with the highest RPNs. There is no standard convention for this step. Each organization establishes their own guidelines for choosing a threshold RPN level above which corrective actions must be taken to reduce risk or improve the process. A process step with a serious end effect needs to be evaluated for potential corrective action regardless of its likelihood of occurrence or its detectability. Even though the probability of the failure mode occurring and the likelihood of it not being detected might be low, there is always a small chance that it might occur and not be detected, thus resulting in a serious end effect.
9. Development and implementation of additional process controls for those process steps, failure mode and cause combinations that have the highest RPNs or high severity rankings. These new process controls, as in step 5, focus on what can be done to avoid the undesired outcome.

FMEA is a team-based approach.

It requires active participation of a multidisciplinary team consisting of radiation oncologists, medical physicists, dosimetrists, therapists, nurses, engineers, IT personnel and other members as appropriate. The relevant team members need to contribute to the analysis of process steps and failure modes that are related to their clinical duties and to the procedure as a whole. The end result of the FMEA should be a more robust and consistent process that is more likely to produce optimal outcomes and reduce the likelihood of hazardous outcomes. An effective quality management program should focus on improving the entire treatment process and preventing failures.

REFERENCES

1. Pate-Cornell ME, Lakats LM, Murphy DM and Gaba DM. Anesthesia patient risk: a quantitative approach to organizational factors and risk management options. *Risk Anal.* 1997; 17: 511-23.
2. Sheridan-Leos N, Schulmeister L, and Hartranft S. Failure mode and effect analysis: A technique to prevent chemotherapy errors. *Clin J Oncol Nurs.* 2006; 10: 393-398.
3. Duwe B, Fuchs BD, Hansen-Flaschen J. Failure mode and effects analysis application to critical medicine. *Crit Care Clin.* 2005; 21: 21-30.
4. Wetterneck TB, Skibinski KA, Roberts TL, Kleppin SM, Schroeder ME, and Enloe M. Using failure mode and effects analysis to plan implementation of smart i.v. pump technology. *Am J Health Syst Pharm.* 2006; 15: 1528-1538.
5. Huq MS, Fraass BA, Dunscombe PB, Gibbons Jr. JP, Ibbott GS, Mundt AJ, et al. Application of risk analysis methods to radiation therapy quality management. AAPM Task Group report 100. To be published in *Med Phys* 2014.

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JOURNALS

ARTICLE HIGHLIGHTS FROM ASTRO'S JOURNALS

From the May-June 2014 issue of *Practical Radiation Oncology (PRO)*

The Role of Postoperative Radiation Therapy for Endometrial Cancer: Executive Summary of the American Society for Radiation Oncology Evidence-based Guideline

By Klopp et al

This ASTRO guideline provides recommendations on the role of adjuvant therapy in endometrial cancer. In an accompanying editorial, Mitchell Edelson, MD, and the Society of Gynecologic Oncology Clinical Practice Committee provide a surgical point of view. A free podcast interview with the authors is available at www.practicalradonc.org.

Highlights from the *International Journal of Radiation Oncology • Biology • Physics*

JUNE 1, 2014

Patterns of Radiation Therapy Practice for Patients Treated for Intact Cervical Cancer

By Eifel et al

QRRO reports on cervical cancer radiation treatment in randomly selected U.S. facilities and finds a strong correlation between the size and type of facility and the rate of compliance with quality standards. An editorial by Gillian Thomas, BSc, MD, emphasizes the lessons of this study.

Posttraumatic Stress Disorder After High-Dose-Rate Brachytherapy for Cervical Cancer

By Kirchheiner et al

A high prevalence of symptoms of posttraumatic stress disorder is found among women who received brachytherapy for cervical cancer.

Proton Radiation Therapy for Head and Neck Cancer

By Holliday and Frank

This review article looks at proton therapy and whether it can improve outcomes when used in the treatment of common head and neck malignancies.

Proton Therapy Expansion Under Current U.S. Reimbursement Models

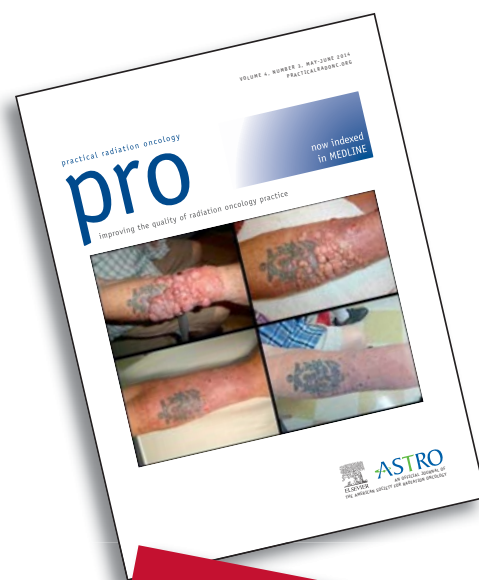
By Kerstiens and Johnstone

These authors show that the expansion of proton centers in the United States is not sustainable under the current reimbursement model. An editorial by Michael L. Steinberg, MD, FASTRO, takes a look at this somber reality.

Prospective Randomized Phase 2 Trial of IMRT in Intermediate-risk Prostate Cancer

By Freytag et al

A randomized phase II trial examines the potential of oncolytic adenovirus-mediated cytotoxic gene therapy to improve the outcome of IMRT in intermediate-risk prostate cancer.



JULY 1, 2014

Radiation Therapy Infrastructure and Human Resources in Low- and Middle-income Countries

By Datta et al

The authors use the World Bank classification to define 139 LMICs and their radiotherapy facilities using the International Atomic Energy Agency Directory of Radiotherapy Centers database. The study measures the numbers of these nations currently

meeting the recommendations laid out by the IAEA, projecting ahead to the shortfall anticipated by 2020.

International Outreach: What Is the Responsibility of ASTRO and the Major International Radiation Oncology Societies?

By Mayr et al

This article explains the role of ASTRO's International Education Subcommittee to help advance radiation oncology care for cancer patients worldwide. The authors emphasize the need for societies and educational, governmental and other organizational groups to work together to meet these needs.

Implementation of a High-dose-rate Brachytherapy Program for Carcinoma of the Cervix in Senegal: A Pragmatic Model

By Einck et al

Addressing the Growing Cancer Burden in the Wake of the AIDS Epidemic in Botswana: The BOT-SOGO Collaborative Partnership

By Efsthathiou et al

Many developed world institutions are adopting institutions in low- and middle-income countries. In these articles, the authors discuss the University of California San Diego linking with a center in Senegal and Massachusetts General Hospital with another in Botswana. Each "parent" institution shuttles staff and equipment to the adoptee, develops deep human relationships, trains caregivers and uses the Internet to consult and run tumor boards.

Cobalt, Linac or Other: What Is the Best Solution for Radiation Therapy in Developing Countries?

By Page et al

These authors closely examine cobalt teletherapy and compare it to the linear accelerator. The article emphasizes

cobalt's cost, planning and low maintenance advantages; however, it does not underestimate the associated security and safety risks.

JULY 15, 2014

Modern Radiotherapy for Hodgkin Lymphoma: Field and Dose Guidelines from ILROG

By Specht et al

The International Lymphoma Radiation Oncology Group has developed guidelines to address the use of combined modality treatment in radiation therapy, as well as involved node radiotherapy and involved site radiotherapy for the treatment of Hodgkin lymphoma.

Interobserver Variability in Target Definition for Hepatocellular Carcinoma With and Without Portal Vein Thrombus

By Hong et al

A panel of 11 gastrointestinal radiation oncologists define hepatocellular carcinoma gross tumor volumes on several imaging datasets with varying degrees of tumor venous thrombus.

Cost-effectiveness Analysis of IMRT Versus 3-D CRT for Anal Cancer


By Hodges et al

These authors use a Markov decision model to assess the cost-effectiveness of IMRT and find it to be a cost ineffective strategy despite the reduction in acute treatment toxicities and the associated costs of management. A separate editorial provides important context and discusses the difficulties inherent in such studies.



Multi-field Optimization Intensity-Modulated Proton Therapy for Head and Neck Tumors: A Translation to Practice

By Frank et al

This study explores the use of multi-field optimization intensity modulated proton therapy for head and neck cancers to help address the uncertainty and hazard due to the complex anatomy, presence of air and fluid cavities, and tissue heterogeneity. 

Access these articles and more on the *PRO* website at www.practicalradonc.org, the Red Journal website at www.redjournal.org and the HealthAdvance mobile application at www.journals.elsevierhealth.com/periodicals/mobileapps.

ASTRO's Gold Medal

Leonard L. Gunderson, MD, MS, FASTRO

mentor many residents and staff colleagues within the field of radiation oncology and associated disciplines. I feel strongly about the advantages of a team approach in the triad of patient care, research and education, and in having successful shared-leadership within institutional departments, organizations and families. Effective mentoring helps achieve these goals," said Dr. Gunderson, an emeritus professor and consultant in the Department of Radiation Oncology at the Mayo Clinic.

Nancy J. Tarbell, MD, FASTRO

tion oncology, particularly women. She was the founding director of the Office for Women's Careers and the Office of Faculty Development at Massachusetts General Hospital, and introduced programming to support and educate

women about paths to promotion, improving negotiating skills and managing work/family balance. She also co-chaired the Women in Academic Medicine Committee at Massachusetts General Hospital, which brought in senior leaders from across the institution to address policy concerns and identify institutional obstacles to women's advancement.

"I benefited greatly from the mentorship of Sam Hellman, MD, FASTRO, while he was chair of the Harvard Joint Center for Radiation Therapy. He mentored deeply and intuitively and continues to be an extraordinary leader today. He gave me opportunities when there were few women role models. I hope that I have shared like-opportunities with the many young men and women whom I have taught, particularly women," said Dr. Tarbell, the dean for academic and clinical affairs at Harvard Medical School in Boston and the C.C. Wang Professor of Radiation Oncology at Harvard Medical School and Massachusetts General Hospital in Boston. [A](#)

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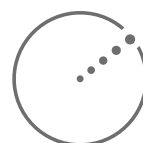
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