SOCIETY OF NUCLEAR MEDICINE AND MOLECULAR IMAGING
CARDIOVASCULAR COUNCIL
NEWSLETTER

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President's Message

Dear Colleagues,

At the SNMMI Annual Meeting in Philadelphia, I had the honor of succeeding Dr. Panithaya Chareonthaitawee as President of the Cardiovascular Council (CVC). I thank all of the members of the CVC for your ongoing support and look forward to our continued success.

We are all grateful to our Immediate Past-President, Dr. Panithaya Chareonthaitawee, for her leadership over the last year. Her management style, an 'iron fist in a velvet glove', was highly effective with many significant achievements; including the successful Mid-Winter and Annual Meetings, and the joint SNMMI/ASNC publications on 'The Role of ^{18}F-FDG PET/CT in Cardiac Sarcoid Detection and Therapy Monitoring' (https://www.ncbi.nlm.nih.gov/pubmed/28765228) and 'Clinical Quantification of Myocardial Blood Flow' (https://www.ncbi.nlm.nih.gov/pubmed/29242396). She gently and effectively engaged and encouraged the Council to achieve our goals and exceed our expectations. She furthered our efforts for outreach to other cardiovascular imaging societies by collaboration on joint statements and encouraging participation and co-sponsorship in our educational programs.

The 2018 SNMMI Annual Meeting was outstanding. The CVC was well represented with the Categorical Session 'Case-Based Review of Advanced Cardiovascular Imaging' and numerous Continuing Education Sessions with topics ranging from 'Measurement of Myocardial Blood Flow' to 'Cardiovascular Molecular Imaging'. The CVC sponsored sessions were well attended and received excellent evaluations.

We are looking forward to the 2019 SNMMI Mid-Winter Meeting on January 17-19 in sunny Palm Springs, California. The featured theme is 'Cardiovascular Nuclear Medicine' with ten sessions and 40 presentations sponsored by the CVC. Topics begin with a refresher on basic concepts of stress testing and move on to exciting new areas of research and discovery. World renowned speakers will discuss multimodality imaging of amyloidosis, sarcoidosis and infection of cardiac valves, PET measurement of myocardial blood flow and NaF PET imaging of valvular and coronary vascular disease. All presentations will be case-based with much emphasis and time allotted for audience and speaker interaction.

This is an exciting time to be a professional in Cardiovascular Nuclear Medicine. PET myocardial perfusion imaging is becoming established as an important clinical tool for patient care and is now reimbursed in the USA and Canada. Cardiac nuclear imaging has evolved and now includes detection and monitoring of amyloidosis, sarcoidosis, vasculitis and infection of cardiac valves and devices. We are well positioned to assist and direct

delivery of optimized patient-centered care. We are meeting the challenges of changing reimbursement models and facilitating the development of Appropriate Use Criteria for selection of cardiac nuclear testing.

I am sure that we are all looking forward to the Mid-Winter Meeting in Palm Springs, California and the opportunity for learning from the experts and relaxing in the sun.

Sincerely,

Terry Ruddy

Terrence Ruddy, MD, FRCPC, FACC, FAHA, FCCS
Cardiovascular Council President

Blumgart Award Profile: Thomas Helmut Schindler, MD

The Hermann Blumgart Award is the highest award and honor bestowed by the Cardiovascular Council. The election by the Board of Directors of the CVC is based on criteria of both scientific contributions to the field of cardiovascular nuclear medicine and service to the Council.

Figure 1: From left to right, Vasken Dilsizian, MD; Panithaya Chareonthaitawee, MD; Thomas Schindler, MD; Robert Gropler, MD

In terms of the scientific contributions to the field, Dr. Schindler has always had the "inside" lane; that is to say, with regard to the "inside" of the coronary arteries. As the Associate Professor of Radiology at the Washington University School of Medicine in St. Louis, he has established quite the pedigree for assessing cardiovascular endothelial function with PET imaging at some of the premier research centers in the world.

It is precisely the complexity of cardiovascular biology that compels Thomas to search for new ways to unravel the associations between the biomarkers associated with cardiovascular risk, and the processes that drive the development of advanced and multi-vessel disease over time. In this arena, he expects the well-established mainstays of cardiac PET, viability, perfusion and blood flow, to expand into new frontiers of cardiac inflammatory-infiltrative disease such as sarcoidosis, aortitis, cardiovascular device infections, and receptor-based imaging to connect the experimental findings to the clinic.

The journey begins with his pre-medical, natural science training at the University of Fribourg in Switzerland, followed by his post-graduate, medical training and doctorate in Radiology at the University of Leipzig, Germany in 1996. Subsequently, Thomas started residency in pathology at St. Vincentius Hospital in Karslruhe, in the town of his birth. He was attracted to Pathology as a residency as it can lay a broad foundation for internal medicine; in particular, understanding the diagnostic pitfalls and clinical difficulties in a broad range of disease entities.

Thomas continued on to his Residency in Medicine and Cardiology at the University of Freiburg in Germany in 1996 and added a Residency year at the father's Institute of Medicine and Radiology, while continuing his research activities as head of the nuclear cardiovascular research group at the University Hospital until 2000. By this time, he understood that coronary circulatory dysfunction was central to cardiovascular risk stratification, but subject to a host of influences across numerous risk factors, such as genetics, dyslipidemia, smoking and diabetes.

In his Blumgart Award lecture, Thomas credited his early mentors, Professor Frank Schmidt (Director of MRI) at the University Hospital Leipzig, Professor Hanjoerg Just (Director of Cardiology) at the University Hospital Freiburg, and Professor Egbert Nitzsche (Director of Nuclear Medicine) at Freiburg.

In Leipzig, Prof. Schmidt provided him the unique opportunity to work on the newly installed Magnetic Resonance Imaging (MRI) scanner and to pursue his doctorate thesis. The Radiology Department Chair, Prof. Hans-Georg Schulz and, in particular, Thomas's mentor Prof. Schmidt welcomed him in such a collegial way that he nearly pursued his residency in Radiology; but it came out "a bit differently". His path continued at the University of Freiburg (Germany), where he was offered a residency position in medicine-cardiology by Prof. Hanjoerg Just. At that time, Freiburg was internationally renowned for various research activities; but in particular for the invasive assessment of coronary function and outcome prediction.
Thomas was not only heavily trained in clinical cardiology but also in the catherization lab during this 2-year period. When Prof. Nitzsche, returning from UCLA, installed the PET scanner in Nuclear Medicine, he took the opportunity to translate the concepts of the invasive assessment of coronary endothelial function to non-invasive measurements with N13-ammonia PET imaging. Thanks to Prof. Nitzsche's unique friendship, mentoring, and collaboration with Thomas, the University of Freiburg was the first center in Europe to apply myocardial perfusion and myocardial blood flow quantification in both the research and clinical settings. Seminal publications soon followed; the prediction of cardiovascular outcome by PET assessment of coronary function (*J Am Coll Cardiol* 2005), followed by unraveling the role of inflammation to contribute to coronary endothelial dysfunction (*Circulation* 2004), and potential reversal by anti-oxidant intervention (*JACC* 2003).

All these activities, however, would not have been possible without Thomas's mentor in Cardiology and Director of the Division, Prof. Hanjoerg Just. Apart from an outstanding clinical education in Cardiology (that Thomas nowadays likes to compare with the one at Johns Hopkins University), Prof. Just continued to mentor him in the field of coronary vasomotor assessment and supported his research activities that translated into several publications in high impact journals such as Circulation and JACC. All these mentors formed Thomas in the early stage of his clinical-research career with their very kind, caring, and compassionate characters; not only in the professional field, but very personally as well.

With the retirement of Prof. Hanjoerg Just, however, the journey then continued.

Following a 2-year Cardiology Fellowship at the University Hospitals of Basel, Switzerland, Thomas earned a position as a Postdoctoral Research Fellow at UCLA from 2002-2006 under Professor Heinrich Schelbert, one of the principal pioneers of PET imaging. This unique and formative time at UCLA was described by Heinz Schelbert as follows:

"Thomas could establish a set of quantitative parameters for delineating coronary circulatory function and for identifying and quantifying vasomotor disturbances that likely represent preclinical stages of developing coronary atherosclerosis. Initial clinical investigations validated non-invasively PET-measured myocardial blood flows and their responses to pharmacologic and sympathetic stimuli as accurate and reproducible tools for probing the coronary circulation. These sets of tools enabled him to not only quantify the total coronary vasodilator capacity, but also to specifically target and evaluate endothelial function as a marker of coronary vascular health. This research provided a frame work for designing treatments strategies for modifying or reducing the coronary risk."

At this point the inclination and talent for cardiovascular medicine and vascular research was permanently fixed, as he won Young Investigator Awards from SNMMI in 2004 and 2005, and ASNC's Clinical Research Award in 2006.

Thomas would return to the European continent in 2006, initially as Assistant Professor of Medicine (Cardiology) and head of nuclear cardiovascular imaging at the University of Geneva School of Medicine in Switzerland. In view of his teaching and research achievements, he was nominated in 2009 to the rank of "Privat-Dozent" (equivalent to Associate Professor), and in 2010 he was also promoted to the Deputy Head Physician in the division of Cardiology in view of his heavy clinical services and training of residents and fellows. Thomas's research group in Geneva could identify for the first time that an increase in so-called "endocannabinoids", released from the adipose tissue into the arterial circulation, as endogenous risk factors to induce a dysfunction of the coronary circulation, deemed as functional precursor of the atherosclerotic process, in obesity.

Based on his international renowned clinical and research reputation, Dr. Schindler was recruited as Director for Nuclear Cardiovascular Medicine and as Associate Professor on March 2013 at the Johns Hopkins Hospital to develop a world-class clinical and research cardiovascular imaging program. The research program was tailored to the role of PET imaging of key myocardial receptors as a pathway to unlocking personalized medicine approaches. By this time, he had developed a keen interest in the connections between obesity and the activation of the endocannabinoid system as a driver of coronary circulatory dysfunction, but also potentially of heart failure. In a seminal publication, his group could indeed demonstrate in a translational imaging study from mice to humans that myocardial cannabinoid type 1 receptors were indeed upregulated in obesity as compared to normal weight controls with a novel radiotracer and PET imaging (Valenta et al. JACC Cardiovasc Imaging 2018). During his tenure, the numbers of cardiovascular PET examinations quadrupled, and he strived continuously to contribute to make the nuclear medicine residency program number one in the US for following two years.

In the service of the SNMMI, Thomas was first elected to the CV Council Board of Directors in 2007 and ascended through engagement and contribution to the President's position for the 2015-2016 term. Peripherally during this time, he also contributed as a board member to the CMIIT, Committee on Councils, Membership Task Force and SNMMI House of Delegates. He remains involved at a very high level, as part of the program committee for the recent Annual Meeting in Philadelphia, as a Board member on the Committee on Outreach, and he is currently the Vice-Chair for the SNMMI membership committee, and in particular Chair of the AUC Committee for Cardiac PET-MPI.

Hermann Blumgart himself was described as a "Teacher, Physician, Administrator and Scientist" (Clin Cardiol. 1991; 15:308-311). Dr. Schindler's commitment to the field is similarly expressed by his extensive work as a mentor, lecturer, grant administrator, author and prolific publisher.

As a teacher, he has held the titles of "Tutor" for pre- and post-graduate courses as early as 2006 in Geneva, through to his current Associate Professor responsibilities to residents and fellows. He has provided no less than 119 clinical and technical lectures by invitation to scientific gatherings all over the world.

As an author and co-author of 110 original publications and 12 book chapters, he found time to serve as a reviewer for NEJM, JAMA, Circulation, JACC (including Cardiovascular Imaging), European Heart Journal (including Cardiovascular Imaging), ASNC's Journal of Nuclear Cardiology as well as JNM and EJNMMI (and several others).

He is currently still providing his editorial expertise to Circ-Cardiovascular, JACC Imaging, JACC, European Heart Journal, Annals of Nuclear Cardiology, and JNC. He has received prestigious reviewer awards from JACC, EHJ-CVI, and the Reviewer of the Year Award of the European Heart Journal in 2015. In addition to these commitments, he has managed a large number of scientific grants for his affiliates, while serving on research grant committees internationally.

Figure 2: Ines Valenta Schindler, Laura Schindler, Thomas Schindler

Dr. Schindler most likely receives enthusiastic support for his efforts at home, as his wife of 7 years, Ines Valenta-Schindler, is herself an established cardiac imager, having been a finalist in the Young Investigator competition in 2016; and who has published data on longitudinal PET flow gradients versus angiographic FFR, and ongoing work in upregulation of myocardial cannabinoid receptors.

Dr. Schindler was deeply moved by his selection as the Blumgart recipient, and most humbly and sincerely presented his path to the present day with great appreciation for his family, friends and mentors throughout his short but stellar career. His young daughter Laura, born in 2016 but already a veteran of the ACC meeting in 2017, was quite vocal during his presentation, no doubt in support of the many great scientific endeavors undertaken by her father since his passion for cardiovascular research began.

As previously mentioned, Dr. Schindler is currently pursuing his passion for cardiovascular health research at the Washington University School of Medicine in St. Louis, an ideal venue for pursuit of the possibilities PET imaging can bring to the understanding of the molecular, biologic and physiologic processes that drive cardiovascular disease. His drive, knowledge, curiosity, work ethic and commitment stand as a great tribute to the legacy of Hermann Blumgart, and the promise that it holds for our field.

The Cardiovascular Council (CVC) of the Society of Nuclear Medicine and Molecular Imaging asks you join us in congratulating Thomas Schindler, MD as the 2018 recipient of the Hermann Blumgart Award.

2018 Young Investigator Awards

The Cardiovascular Council would like to congratulate the winners of the 2018 YIA competition at the SNMMI Annual Meeting. CV Council President Panithaya Chareonthaitawee presented the awards.

Basic Science

1st Place: Annika Hess

"CXCR4-targeted imaging of leukocyte mobilization after myocardial infarction"

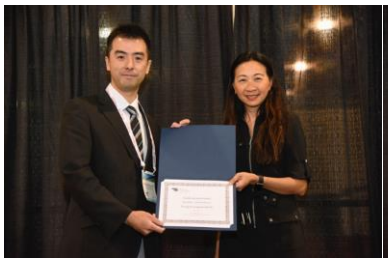
2nd Place: Mirwais Wardak

"Molecular Imaging of Cardiovascular Infections with 6"-[18F]-Fluoromaltotriose PET/CT"

3rd Place: Rang Wang

"Radiosynthesis and Biological Evaluation of a Novel Berberine Derivative for Cardiac PET Imaging"

Clinical Science



1st Place: Takashi Norikane	2nd Place: Carmella Nappi
"Correlation of noninvasive imaging of vulnerable carotid artery plaque using NaF and FDG PET/CT and black-blood MRI with cerebral ischemia on brain MRI"	"Simultaneous cardiac 18F-FDG PET/MR for the assessment of different stages of cardiac impairment in patients with Anderson-Fabry disease."

2017-2019 CVC Intern Updates

The 2017-2019 CVC Interns are Stephanie Thorn, PhD, and Richard L. Weinberg, MD, PhD.

The SNMMI Internship Program was established in 2008 with the aim, "To identify and train future leaders of SNMMI in the structure, governance, and operations of the organization, to prepare individuals for progressive levels of responsibility, and to ensure effective leadership that advances the mission and goals of the organization".

Dr. Thorn holds the position of Research Scientist at Yale University, in the Yale Translational Research Imaging Center (YTRIC).

Based on her 2017 award from the ENTELLIGENCE™ Young Investigator program in the US, her large animal model of right ventricular heart failure (RVHF) is producing results. At the Rapid-Fire session of the American Society of Nuclear Cardiology's Annual Meeting, she presented the results of a quantitative assessment of blood flow and function in an overloaded RV.

Rest Tc-99m and dobutamine stress Tl-201 SPECT-CT was performed prior to and ~30 days after placement of a restrictor band to the pulmonary artery (PA). Serial contrast CT and RV hemodynamics were obtained to monitor changes in RV volume and ejection fraction.

The resulting 22-fold increase in PA pressure was accompanied by significant changes in RV/LV volume ratios, RV wall thickness, RV/LV wall thickness ratio, RVEF and RV myocardial blood flow (MBF). The results suggest that the serial dynamic SPECT-CT approach may have implications for the evaluation of RVHF in the presence of PA, HF with preserved EF (HFpEF) and post-LV assist device placement.

In another ASNC abstract co-authored with her colleagues at Yale, the accuracy of global ^{82}Rb PET MBF was evaluated for accuracy against different quantitative methods when motion correction (MC) was applied. 10 subjects with known or suspected CAD were analyzed by 10 nuclear cardiology technologists, creating 100 total values. The results suggest that patient motion can have a significant effect on myocardial flow reserve (MFR) values, and the difference can vary between quantitative and corrective methods.

In addition to the scientific work presented at ASNC, she contributed a lecture in the 'Advanced' track on Instrumentation in Pre-Clinical Imaging.

Dr. Weinberg is a consultative cardiologist with clinical and research interests in nuclear cardiology. In 2018, he was named Associate Program Director of the Cardiovascular Disease Fellowship Program at the University of Michigan.

2018 has been a busy and productive year, as he co-authored four publications following his contributions to the 'Standardized Reporting of Nuclear Cardiology Procedures' guidance published in the Journal of Nuclear Cardiology (JNC) in December of 2017.

Three publications in the JNC this year focus on PET quantification, specifically toward critical technical and quantitative parameters that can affect the accuracy of results of MBF and MFR. A large observational series (225 subjects) published in March identified mild to moderate motion in the blood phase in 63% and 44% of the stress and rest studies, respectively. Isolating blood phase motion in the inferior direction resulted in mean MBF and MFR errors of 29%-44% in the right coronary territory, and MBF and MFR errors increased most substantially with motion in the inferior direction.

This effort was followed by the development of an automatic dynamic motion correction algorithm capable of correcting the full dynamic sequence for translational motion. The results matched the manual correction method and improved the limits of agreement for stress MBF globally by twofold.

A retrospective clinical study of 117 patients with orthotopic heart transplant published in Circulation Heart Failure in June of this year evaluated the relationship of global MFR and stress MBF to outcomes of CV death, acute coronary syndromes, revascularization and HF hospitalization. Decreased MFR independently predicted the primary endpoint after adjustment for other variables, and in patients who underwent angiography within 12 months, both MFR and stress MBF were associated with moderate to severe allograft vasculopathy.

At the ASNC meeting in September, Dr. Weinberg was an expert panelist in an interesting Ethics Session focused on the role of Radiology Benefit Managers and Decision Support Tools in Nuclear Cardiology. He also discussed the role of imaging in a case-based session dedicated to heart disease in women.

With cardiac PET making inroads to management strategies across broader groups of patients, the work of our CV Interns is helping to build a secure foundation of clinical value and technical accuracy necessary for further advancement of the science.

Please join the Cardiovascular Council in congratulating these two young professionals for their outstanding achievements, and plan attend their sessions and support the important work they are doing to advance the field on behalf of the SNMMI membership.

Preview: 2019 Mid-Winter Meeting

The CV Council Leadership has been working diligently to develop a stellar program for the upcoming Winter meeting in Palm Springs, CA. A half-day of sessions will begin at 1:30 PM on Thursday, January 17, followed by two full days of cardiovascular programs on Friday and Saturday.

Thursday's program kicks off at 1:30 PM with **New Frontiers in Nuclear Cardiology** and will capture some of the hottest topics in the field from the leading experts driving new research and applications. This session will cover MBF, machine learning and new scanner technology for SPECT, and NaF PET imaging applications. It will be moderated by Piotr Slomka (Cedars-Sinai) and Marc Dweck (Mount Sinai).

The late afternoon session beginning at 3:45 will focus on the evolving role of imaging in the **Evaluation of Cardiac Sarcoidosis**, and will cover the full practical range of detection, monitoring, protocols, quantification, interpretation and reporting. This session will be moderated by CVC Past-President Panithaya Chareonthaitawee (Mayo Clinic) and Blumgart Award recipient Thomas Schindler (Wash U).

Friday's program begins at 8:00 AM with a practical session on **Starting a PET Program**, and will feature Professor Heinrich Schelbert, one of the pioneers of PET imaging, in a discussion on tracers and imaging systems. Moderated by Dr. Timothy Bateman of the Mid-America Heart Institute, the faculty will also address facility design, patient selection for SPECT and PET, and the clinical importance of viability and inflammation imaging.

Next at 10:15 AM is another relevant and practical session on an area of intense interest and rapid growth; **PET Myocardial Blood Flow: Nuts and Bolts**. CVC Vice-President Venkatesh Murthy and CVC Intern Richard Weinberg (University of Michigan) organized four discussions on the subjects of tracers and protocols, QC and reporting, clinical implications and the role of new tracers.

After a 1-hour break for lunch, the Friday program resumes with April Mann (Hartford) and Jamieson Bourque (UVa) moderating **Nuts and Bolts of Stress Perfusion Imaging**. This session on important fundamentals of both the exercise test and the imaging component will also feature the added dimension of case-review correlation with other modalities.

Friday's final session at 3:45 PM, moderated by Prem Soman (UPMC) and Jamieson Bourque (UVa) will provide expert perspective on the increasing importance of **Improving Value and Quality in Cardiovascular Nuclear Medicine**. Attendees will hear practical strategies for reducing radiation exposure, understand high value reporting, review Appropriate Use Criteria and the specifics of QA implementation and ICANL accreditation.

On **Saturday** morning at 8:00 AM, another emerging application will be covered in **Amyloidosis Imaging**. Dr.'s Timothy Bateman and Brett Sperry of the Mid-America Heart Institute will moderate some of the field's leading experts in a review of the clinical disease, planar and SPECT applications for detection and quantification, novel PET approaches and the role of CMR.

In the 10:30 session, Dr.'s Murthy and Weinberg collaborate again on **Clinical Controversies Relevant to Imaging** and will address the current thinking on the relevance of ischemia detection, the role of calcium scoring, testing priorities in women, and a case-based approach to the screening of asymptomatic patients.

Cardiovascular Inflammation and Infection Imaging will kick off at 1:30 PM, as SNMMI Vice-President and former CVC President Vasken Dilsizian (University of Maryland) and Asbjorn Scholtens (Meander Medical Center, Netherlands) moderate a session that will elucidate metabolic preparation for FDG imaging, imaging in endocarditis, PET/CT in LVAD infections, and a review of aortitis imaging.

The final session of the Mid-Winter meeting, from 4:00 to 6:00 PM, is focused on one of the legacy applications for PET cardiac imaging, **Viability Assessment**. Dr.'s Chareonthaitawee and Schindler will moderate this final all-start lineup that includes Brett Sperry, Heinrich Schelbert and Vasken Dilsizian to discuss the clinical relevance of viability, patient prep and acquisition techniques, and new concepts of FDG in arrhythmias and the complimentary role of CMR.

2019's program is indeed stellar in terms of both practicality and new innovations. A detailed roster of CV programs and speakers for the MWM can be found by clicking HERE.

Upcoming Cardiovascular Meetings

SNMMI Mid-Winter Meeting/ACNM Annual Meeting
January 17-19
Palm Springs, CA
www.snmmi.org/MWM/

40th Annual High-Country Nuclear Medicine Conference
New for 2019: Hal O'Brien Rising Star Award
March 2-6
Vail, CO
https://www.hcnmc.org/

68th American College of Cardiology
March 16-18
New Orleans, LA
https://accscientificsession.acc.org/

ICNC 2019, Nuclear Cardiology and Cardiac CT
May 12-14
Lisbon, Portugal
https://www.escardio.org/Congresses-&-Events/ICNC

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Thomas Hellmut Schindler, MD	Non-Voting Member
Prem Soman, MD, PhD	Non-Voting Member
Stephanie L. Thorn, PhD	Intern
Richard L. Weinberg, MD, PhD	Intern

Make Your Plans to Attend: Click Below:

The 2019 Mid-Winter Meeting
Palm Springs, CA
January 17-19

Please visit the Cardiovascular Council website for more information and to join or renew your membership!
Your membership is critical to the ability of the CVC to continue providing the highest caliber educational programs!

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