Photon-Counting Multi-Energy CT
Scientific Symposium
Thursday & Friday, October 6 & 7, 2016
Colleagues and Friends,

In September of 2014, the first Scientific Symposium on Photon-Counting Multi-Energy CT was held here in Rochester, MN. With a ribbon-cutting ceremony, we celebrated the installation of the first whole-body, photon-counting CT scanner, the Somatom CountT. This scanner – the first of its kind – offers an unprecedented opportunity to explore the clinical applications of photon-counting detector technology in CT imaging. Since that beginning, the scanner has been completely characterized using phantoms, clinical feasibility has been established using cadavers and animals, and patient studies have begun. A second scanner has been installed at the NIH Clinical Center, and together, we are working to demonstrate the superior properties of photon-counting-detector CT, the knowledge of which will set the direction for this technology. Over the next two days, we will review the physics and technical aspects of the system and the work that has been accomplished since 2014. More importantly, we will engage in discussions on future studies and directions.

On behalf of each member of our respective teams – physicians, scientists, engineers, research fellows and trainees – we welcome you to the Mayo Clinic for this Scientific Symposium on Photon-Counting Multi-Energy CT.

Cynthia McCollough
Director, CT Clinical Innovation Center, Mayo Clinic

Andre Hartung
President, CT and Radiation Oncology, Siemens Healthineers
Thursday, October 6, 2016

Continental Breakfast 8:00-8:45

Welcome and Meeting Objectives 8:45-9:00
- Cynthia H. McCollough, PhD

Session I: State-of-the-Art Photon-Counting CT Technology
Moderators: E. Ritman and A. Henning

Physics of photon-counting CT 9:00-9:30
- Thomas Flohr, PhD

Design of the Siemens photon-counting CT system: An update 9:30-10:00
- Steffen Kappler, PhD

~ 20-minute break ~

Session II: CounT Research Programs
Moderators: A. Pourmorteza and B. Schmidt

Overview of Mayo’s CounT research program 10:20-10:40
- Cynthia McCollough, PhD

Overview of NIH’s CounT research program 10:40-11:00
David Bluemke, MD, PhD

Overview of Siemens’ CounT R&D program 11:00-11:20
- Stefan Ulzheimer, PhD

Discussion 11:20-11:40

Lunch 11:45-12:45

Leadership Perspective: The Importance of Academic and Industrial Collaborations in Medicine 12:45-1:00
- Kimberly Amrami, MD

Session III: Clinical Studies using the CounT: Macro Mode
Moderators: D. Bluemke and T. Flohr

Technical performance of the Macro mode 1:00-1:20
- Ralf Gutjahr

CounT studies in neurological imaging 1:20-1:40
- Norbert Campeau, MD
CounT studies in contrast-enhanced abdominal imaging 1:40-2:00  
- Amir Pourmorteza, PhD

CounT studies in non-contrast GI imaging 2:00-2:20  
- J.G. Fletcher, MD

CounT studies in non-contrast GU imaging 2:20-2:40  
- Roy Marcus, MD

Discussion 2:40-3:00

~ 20-minute break ~

Session IV: High Resolution Imaging using the CounT
Moderators: C. McCollough and S. Kappler

Technical performance of high resolution modes 3:20-3:40  
- Kishore Rajendran, PhD

CounT studies in temporal bone imaging 3:40-4:00  
- Jack Lane, MD

CounT studies in atherosclerotic research 4:00-4:20  
- Erik Ritman, MD, PhD

CounT studies in thoracic imaging 4:20-4:40  
- David Levin, MD

CounT studies in musculoskeletal imaging 4:40-5:00  
- Katie Glazebrook, MB, ChB

Discussion 5:00-5:20

~ End of Day One ~

Dinner (Chester’s) 6:30 p.m.
Continental Breakfast 8:00-8:45

Overview of Day Two 8:45-9:00

**Session V: Post Processing of CounT data**  
*Moderators: S. Leng and S. Ulzheimer*

Spectral capabilities & limitations of the CounT readout modes 9:00-9:20  
- Steffen Kappler, PhD

Dual-energy post-processing applications 9:20-9:40  
- Ahmed Halaweish, PhD

Multi-energy post-processing & k-edge imaging 9:40-10:00  
- Bernhard Schmidt, PhD

Spectral PICCS iterative reconstruction 10:00-10:20  
- Shuai Leng, PhD

Discussion 10:20-10:40

~ 20-minute break ~

**Session VI: Potential Research Projects and Collaborations**  
*Moderators: J.G. Fletcher and A. Halaweish*

Brainstorming: Project ideas 11:00-12:00

Summarize most promising projects 12:00-12:30

Lunch 12:30-1:30

Wrap Up/Next Steps 1:30-2:30

~ END OF SYMPOSIUM ~ 2:30

*Thank you, and safe travels*
Program Director
Cynthia H. McCollough, PhD*
Professor of Medical Physics and Biomedical Engineering
Mayo Clinic
Rochester, MN

Katrina Glazebrook, MB, ChB
Associate Professor of Radiology
Mayo Clinic
Rochester, MN

Ralf Gutjahr
Pre-doctoral Fellow
Siemens Healthineers
Forchheim, Germany

Faculty
Kimberly K. Amrami, MD
Professor of Radiology
Mayo Clinic
Rochester, MN

Ahmed Halaweish, PhD*
Staff Scientist
Siemens Healthineers
Malvern, PA

David A. Bluemke, MD, PhD
Director of Radiology and Imaging Sciences
National Institutes of Health Clinical Center
Bethesda, MD

Andre Henning
Project Manager
Siemens Healthineers
Forchheim, Germany

Norbert G. Campeau, MD
Assistant Professor of Radiology
Mayo Clinic
Rochester, MN

Steffen Kappler, PhD
CT Technology Manager
Siemens Healthineers
Forchheim, Germany

Joel G. Fletcher, MD
Professor of Radiology
Mayo Clinic
Rochester, MN

John I. Lane, MD
Professor of Radiology
Mayo Clinic
Rochester, MN

Thomas Flohr, PhD*
Director of CT Physics and Application Development
Siemens Healthineers
Forchheim, Germany

Shuai Leng, PhD*
Associate Professor of Medical Physics
Mayo Clinic
Rochester, MN
We gratefully acknowledge the following organizations and people for making this symposium possible:

- Siemens for providing travel support, breakfasts, lunches, and refreshments for faculty and attendees
- Mayo Clinic for providing the meeting space
- The program committee for their work on organizing the meeting’s content
- The faculty for sharing their time and knowledge with us
- Dr. Ahmed Halaweish for organizing lodging and local transportation
- Ms. Kristina Nunez for organizing meeting and program logistics