X 線 CT 装置等を活用した産業のデジタル化技術に関するワークショップ

ドイツにおける大型 X 線 CT の開発・利用動向と日本の取組

主催：サイバー・フィジカル・エンジニアリング技術研究組合
後援：一般財団法人　機械システム振興協会

概要

サイバー・フィジカル・エンジニアリング技術研究組合では、今年度、福島国際研究教育機構（F-REI）の令和 5 年度事業「超大型 X 線 CT 装置等を活用した産業のデジタル化技術の開発等に関する調査研究事業」を実施しています。この度、本事業の一環として、ドイツから技術者を招聘し、本ワークショップを開催することになりました。産業用 X 線 CT は、近年、非破壊検査だけでなく、形状計測にも利用が広がっており、X 線 CT により取得したデータを製品開発で活用する技術が注目されています。本ワークショップでは、世界最大の超大型 X 線 CT をもつドイツ・フラウンホーファ研究財団 EZRT 研究センターと、高機能な X 線 CT を開発しているドイツ diondo 社の技術者に、技術やユーザーニーズの最新動向について講演をお願いしています。多くの皆様のご参加をお待ちしております。

- 開催日時：　2024 年 2 月 28 日　(水曜日)　13:30～16:00
- リアル会場：東京大学工学部 11 号館 講堂
  HASEKO-KUMA HALL　（東京都文京区本郷）
- オンライン：Zoom による配信
- 参加ご希望の方は、下記から参加登録をお願いします（締切 2 月 2 2 日）
  https://forms.office.com/r/06NbuB5J87
  オンライン参加の方には前日までに Zoom の URL をメールでお送りします。
- 参加費：無料
- 言語：海外からの講演者は英語で発表します。

アクセス

参加登録

プログラム

司会 齋藤直昭、サイバー・フィジカル・エンジニアリング技術研究組合・専務理事

13:30～13:40 開会
澤飯明広、サイバー・フィジカル・エンジニアリング技術研究組合・理事長

13:40～14:40　*Future of XXL-CT: Establishing new industrial fields of application for computed tomography*　（英語）
Michael Salamon and Nils Reims, Fraunhofer EZRT, Germany

14:40～14:50 休憩

14:50～15:30　*30 Years of Innovation in MeV and customized CT*（英語）
Dr. Nick Briereley, Head of R&D, diondo, Germany

15:30～15:50 産業用 *X* 線 *CT* データを活用するサイバー・フィジカル・エンジニアリング
高山光弘、サイバー・フィジカル・エンジニアリング技術研究組合・常務理事

15:50～16:00 閉会
鈴木宏正、サイバー・フィジカル・エンジニアリング技術研究組合・参事

お問合先 鈴木宏正　(suzuki@cpe.or.jp)
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Future of XXL-CT: Establishing new industrial fields of application for computed tomography

Michael Salamon and Nils Reims, Fraunhofer EZRT, Germany

Abstract
The Fraunhofer Development Centre for X-ray Technology (EZRT) is a leading institution for the development of innovative testing methods for industrial use based on X-rays, optics and magnetic resonance. After brief introduction of the EZRT, we will focus on the globally unique XXL-CT system and the technology behind it. Since its commissioning in 2013, it has solved numerous tasks that could not previously be solved with other CT systems. The imaging properties play a special role. Due to the three factors penetration capability, material tolerance and density fidelity, the use of this technology is highly beneficial and opens up new fields of application for CT technology e.g. the documentation and recording of realistic digital twins. The progress of this system development will be showcased through the XL-Gantry-CT currently under construction at the Technical University of Kaiserslautern. The construction of a rotating X-ray system opens up the possibility for CT scanning of large objects that have to be scanned in a lying position. The challenges and technical solutions will be presented and discussed in the lecture.
We also address the process of value creation for the raw data generated by XXL-CT systems. Given the current high measurement costs, this factor becomes crucial for the widespread adoption of this technology in the CT and data digitization market. The large amount of data from such a scan contains important information for numerous departments of car manufacturers or other user groups. Until now, accessing this information was limited to a very small group of specialized people with special hardware. To eliminate this bottleneck, the EZRT is developing methods to make the data easily usable on any desktop PC. A core of this development is the Sparsely Coded Residuals (*.scr) data format, which achieves enormous compression rates for the huge amount of data. Only this combination of the most advanced X-ray technology and a high degree of data democratization makes everyday use in industry meaningful beyond sporadic forensic use.

Michael Salamon is heading the group High Energy X-ray Systems at the Fraunhofer-Development Center X-ray Technology, Fraunhofer-Institute for Integrated Circuits, Fürth. Michael graduated as an engineer for biomedical engineering (Dipl.-Ing.(Fh)) at the University of Applied Sciences in Münster. He completed his studies with a diploma thesis at the Fraunhofer Institute for Integrated Circuits IIS in the department Development Center X-ray Technology. The focus of his research activities was the development of high-resolution computed tomography for material characterization and the development of customer-specific X-ray solutions. In 2010, Michael Salamon took over the management of the Laboratory X-ray Systems Group and expanded the spectrum from high-resolution CT to high-energy CT as part of the Group's activities. Since 2016, Michael Salamon is head of the High Energy X-ray Systems group, which concentrates entirely on the operation, further development and marketing of the XXL-CT. 2018 Michael Salamon and his team received the Fraunhofer Prize for the development of the XXL-CT technology. In addition to these activities, Michael Salamon is working on the development of new X-ray techniques for observation of the crystal growth of SiC crystals in PVT reactors as part of his doctoral thesis.

Nils Reims is working in the group High Energy X-ray Systems at the Fraunhofer-Development Center X-ray Technology, Fraunhofer-Institute for Integrated Circuits, Fürth.
He obtained his Master of Engineering degree in Electrical and Mechanical Systems from the University of Applied Sciences Nürnberg in 2011. After working in the field of Compton spectrometry and Monte Carlo X-ray simulation for several years, since 2011 he focused completely on high energy X-ray CT including developing and building up the XXL-CT system in Fürth. Currently, Nils focuses on the continuous operation and enhancement of the XXL-CT system, as well as the development of new high energy X-ray systems. He serves as the project lead for the Gantry-Type XXL-CT system at the University of Kaiserslautern which will start operation in 2024.

30 Years of Innovation in MeV and customized CT

Dr. Nick Briereley, Head of R&D, diondo, Germany

Abstract
diondo recently celebrated its 10-year anniversary, but this builds on the core team's preceding 20 years' experience in industrial X-ray computed tomography – in fact starting with a pioneering, XL MeV machine. Over the decades the team has developed numerous innovative and highly customised machines, notably including two XL systems delivered to Tokyo Museum. In recent years, diondo has reinforced its reputation for highly flexible, upgradable machines, for all length scales – with a selection of standard machine platforms and a modular software, that serve as the basis for the majority of system builds. This talk will provide an overview of the experience of the company and insights into the future of industrial X-ray computed tomography.

Dr Nick Brierley leads the R&D team at diondo, a leading manufacturer of X-ray Computed Tomography systems, based in Hattingen, Germany. Within his current role, he steers the company's technical strategy whilst managing the team to deliver a wide range of (frequently collaborative, externally funded) R&D projects. Prior to joining diondo, Nick spent 6.5 years at the Manufacturing Technology Centre (MTC) in Coventry, UK, where he was a Principal Research Engineer, responsible for the X-ray imaging activities – usually in the context of metal additive manufacturing, as the MTC hosts the National Centre for Additive Manufacturing. Nick holds a doctorate in NDT from Imperial College London and an MA in Natural Sciences (Physics) and Management Studies from the University of Cambridge.