



## ***“Dynamic Thermal Imaging – A Valuable Measurement Method for Biomedical Applications”***

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***Tuesday, April 2<sup>nd</sup> 12pm***

***Gateway 1002***

***Pizza will be served***

### **Abstract:**

Thermal imaging, also known as thermography, captures and visualizes the thermal radiation emitted by objects above absolute zero temperature. These infrared images are converted into temperature maps, providing insights into the objects being studied. Recent advancements in infrared imaging technology and dynamic thermal emission measurements have transformed the field, making thermography indispensable in engineering for non-destructive material testing, electronics inspection, and solar cell defect detection. While thermal imaging has seen limited use in biomedical and clinical settings, its potential remains largely untapped. Challenges such as static measurement limitations and early-generation infrared cameras hindered its adoption. Additionally, obtaining quantitative data in biomedical applications often requires complex mathematical modeling due to inherent variability.

This lecture aims to showcase the potential of dynamic thermal imaging in biomedicine and equip readers with the necessary knowledge to apply this technology effectively. It covers the fundamentals of thermal radiation and imaging device technology, enabling readers to select suitable infrared cameras. Understanding thermodynamics and heat transfer processes is crucial for modeling sample behavior. Various dynamic thermal imaging procedures, such as pulsed-thermal imaging and lock-in thermal imaging, offer superior capabilities over passive methods.

### **Bio:**

Mathias Bonmarin studied at the graduate school of science and engineering “POLYTECH Marseille” part of Aix-Marseille University (France) and obtained his master’s degree in biomedical engineering in 2002. He then moved to Grenoble Institute of Technology to gain an additional master’s in optics, optoelectronics, and microwave. After a year working as a scientific assistant at the Fresnel Institute in Marseille, he decided to broaden his perspective and studied economics at the University of Louvain-La-Neuve in Belgium where he graduated “summa cum laude.” Mathias moved to Switzerland in 2006 to do his Ph.D. in physical chemistry at the University of Zurich. He joined the School of Engineering of the Zurich University of Applied Science (ZHAW) as a research associate in 2010 before being appointed senior lecturer at the Institute of Computational Physics in 2014. Between July 2018 and July 2019, Mathias was a Fulbright visiting research scholar at the College of Engineering and Applied Sciences of the University of Cincinnati in the US. Since July 2019 he is a Professor of optoelectronics and leads the Sensors and Measurement Systems group at ZHAW. His research interests focus on the development of innovative sensors and instruments for medicine and biology. Mathias is IEEE senior member (IMS and EMBS) and received the 2019 Best Application in I&M Award

