

# Preface

In today's world, which has recently seen fractures and isolation forming among states, international and interdisciplinary collaboration is an increasingly important source of progress. Collaboration is a rich source of innovation and growth. It is the goal of the Collaborative European Research Conference (CERC 2019) to foster collaboration among friends and colleagues across disciplines and nations within Europe. CERC emerged from a long-standing cooperation between the Cork Institute of Technology, Ireland and Hochschule Darmstadt - University of Applied Sciences, Germany. CERC has grown to include more well-established partners in Germany (Hochschule Karlsruhe and Fernuniversität Hagen), United Kingdom, Greece, Spain, Italy, and many more.

CERC is truly interdisciplinary, bringing together new and experienced researchers from science, engineering, business, humanities, and the arts. At CERC researchers not only present their findings as published in their research papers. They are also challenged to collaboratively work out joint aspects of their research during conference sessions and informal social events and gatherings.

To organize such an event involves the hard work of many people. Thanks go to the international program committee and my fellow program chairs, particularly to Prof Udo Bleimann and Prof Ingo Stengel for supporting me in the review process. Dirk Burkhardt and Dr Robert Loew put a great effort into setting up the website and conference management system and preparing the conference programme and proceedings. Many of my colleagues from Hochschule Darmstadt were invaluable for local organization. Thanks also to Hochschule Darmstadt and the Research Center for Applied Informatics (FZAI) for financial support.

Bernhard Humm, conference and program chair, CERC 2019  
Darmstadt, Germany, March 2019

## Conference Chairs

Prof. Dr Udo Bleimann, Darmstadt University of Applied Sciences, Germany  
Prof. Dr. Bernhard Humm, Darmstadt University of Applied Sciences, Germany  
Dr. Robert Loew, Darmstadt University of Applied Sciences, Germany  
Prof. Dr. Stefanie Regier, University of Applied Sciences Karlsruhe, Germany  
Prof. Dr. Ingo Stengel, University of Applied Sciences Karlsruhe, Germany  
Prof. Dr. Paul Walsh, Cork Institute of Technology, Ireland

## International Scientific Committee

Jens-Peter Akelbein, Darmstadt University of Applied Sciences, Germany  
Udo Bleimann, Darmstadt University of Applied Sciences, Germany  
Ulrich Burbaum, Darmstadt University of Applied Sciences, Germany  
En-Chi Chang, AMG Digital Marketing & Design Company, Taiwan  
Markus Doehring, Darmstadt University of Applied Sciences, Germany  
Klaus-Peter Fischer-Hellmann, Digamma GmbH, Germany  
Marius Faßbender, FILIADATA GmbH, Germany  
Orla Flynn, Cork Institute of Technology, Ireland  
Steven Furnell, Plymouth University, United Kingdom  
Lena Gribel, Plymouth University, United Kingdom  
Gunter Grieser, Darmstadt University of Applied Sciences, Germany  
Vic Grout, Glyndwr University, United Kingdom  
Markus Haid, Darmstadt University of Applied Sciences, Germany  
Joe Harrington, Cork Institute of Technology, Ireland  
Andreas Heberle, University of Applied Sciences Karlsruhe, Germany  
Andreas Heinemann, Darmstadt University of Applied Sciences, Germany  
Peter A. Henning, University of Applied Sciences Karlsruhe, Germany  
Elke Hergenröther, Darmstadt University of Applied Sciences, Germany  
Reimar Hofmann, University of Applied Sciences Karlsruhe, Germany  
Bernhard Humm, Darmstadt University of Applied Sciences, Germany  
Michaela Kiermeier, Darmstadt University of Applied Sciences, Germany  
Martin Knahl, University of Applied Sciences Furtwangen, Germany  
Robert Loew, Darmstadt University of Applied Sciences, Germany  
Margot Mieskes, Darmstadt University of Applied Sciences, Germany  
Martin Moneke, Darmstadt University of Applied Sciences, Germany  
Andreas Müller, Darmstadt University of Applied Sciences, Germany  
Kawa Nazemi, Darmstadt University of Applied Sciences, Germany  
Franz Nees, University of Applied Sciences Karlsruhe, Germany  
Rainer Neumann, University of Applied Sciences Karlsruhe, Germany  
Thomas Pleil, Darmstadt University of Applied Sciences, Germany  
Stefanie Regier, University of Applied Sciences Karlsruhe, Germany  
Sven Rogalski, Darmstadt University of Applied Sciences, Germany  
Frank Schael, Darmstadt University of Applied Sciences, Germany  
Christian Schalles, DHBW Mosbach, Germany  
Jan Schikofsky, University of Goettingen, Germany  
Helen O' Shea, Cork Institute of Technology, Ireland  
Melanie Siegel, Darmstadt University of Applied Sciences, Germany  
Roy Sleator, Cork Institute of Technology, Ireland  
Ingo Stengel, University of Applied Sciences Karlsruhe, Germany  
Uta Stoerl, Darmstadt University of Applied Sciences, Germany  
Bernhard Thull, Darmstadt University of Applied Sciences, Germany  
Ulrich Trick, University of Applied Sciences Frankfurt, Germany  
Christoph Wentzel, Darmstadt University of Applied Sciences, Germany  
Andrea Wirth, University of Applied Sciences Karlsruhe, Germany  
Angela Wright, Cork Institute of Technology, Ireland  
Stefan Zander, Darmstadt University of Applied Sciences, Germany  
Alex Zellner, Germany  
Meike Zellner, University of Applied Sciences Karlsruhe, Germany