



# ISCRAM 2018

Rochester Institute of Technology  
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## POSTER: Universal Design of ICT for Emergency Management: A Research Agenda

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INFORMATION SYSTEMS FOR CRISIS RESPONSE AND  
MANAGEMENT

*“Visualizing Crisis”*

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## INTRODUCTION TO THE POSTER

This is a WiPe paper accepted as poster. It presents work in progress on a research agenda for Universal Design of ICT for Emergency Management, based on a literature study. After the co-authors, coming from Universal Design and Emergency Management research backgrounds, wrote a paper together on “*Universal Design of Information Sharing Tools for Disaster Risk Reduction*” that was successfully presented at the 2nd IFIP Conference on Information Technology in Disaster Risk Reduction ITDRR2017, it was decided to move forward with the collaboration. ISCRAM was considered a suitable venue for the next step, and the authors have therefore proposed a special track as well as this poster on the topic, in the hope to spark interest on the topic. The items on the research agenda proposed in the poster is already used as a source of topics for Master thesis for students in Universal Design of ICT at Oslo Metropolitan University.

## POSTER SUBJECT

Information and communication technologies (ICT) are becoming increasingly important in emergency management and crisis communication. ICT tools are developed and adopted in all phases of the emergency management cycle. On the one hand, these tools contribute to better disaster preparedness and effective response. On the other hand, the lack of consideration of universal design in these tools also creates new barriers for different stakeholders, particularly the elderly and people with disabilities. The primary objective of this paper is to give an overview of the current state of the emerging research field of Universal Design of ICT for emergency management and provide a Research Agenda to highlight ways to uncover how the increasing introduction of ICT in emergency management can contribute to removing barriers instead of adding more barriers.

We argue that the design for all should be a central concept when educating and training designers and engineers for developing ICT systems for emergency management.

We use both the Sendai Framework for Disaster Risk Reduction 2015-2030 and the lessons learned from our literature review as a point of departure to derive a future research agenda concerning universal design of ICT for emergency management.

The concepts of inclusion, universal design and accessibility have been internationally recognized and incorporated in SFDRR to empower people with disabilities in disasters. Nevertheless, there are gaps between a perfect framework for actions and how these universal design principles should be operationalized in practice. Particularly, on universal design of ICT for emergency management, there are some gaps and research opportunities that can be laid down as future research challenges. For example: Have the ICT solutions enabling early warning and alerting people on likely catastrophe taken into account people that have hearing, visual or other impairments that may not notice the alerts? Are the ICT tools for communication and aiding the information exchange between the first responders, the public and the victims, as well as media for information dissemination universally designed? Have ICT technologies for suggesting the first responders or decision makers on various life-saving decisions and aid considered universal design? Have the ICT technologies to support event detection, and assessment which typically are used for disaster prevention, early response and damage mitigation taken into account the vulnerable groups? How can we make more accessible the electronic/ interactive maps and GIS tools that increasingly used for disaster support e.g. to obtain a common operational picture, to inform evacuation route, to assess damages?

There are many ICT tools that have been used for both the first responders and general public for training, navigation, evacuation that should be accessible for all.

Based on the gaps in the current research literature, there is also a significant need for research efforts on the following:

- Improved evaluation methods and framework for universal design of ICT for Emergency Management, taking into account the impact of non-conformance,
- Research on impact of situational disabilities in emergency situations,
- Barrier removal methods and strategies,
- Design/development/acquisition principles for ensuring Universal Design of ICT tools for Emergency Management.
- Universal design of:
  - ICT tools in all categories and all parts of the emergency management cycle, and in particular recovery and mitigation
  - web/mobile-based crisis communication platforms,
  - social media-based crisis communication platforms,
  - emerging technologies for emergency management.

## POSTER PRESENTER

Dr. Terje Gjørseter is Associate Professor at Oslo Metropolitan University, and active member of the research group for Universal Design of ICT. He has previous experience from co-organizing and co-chairing a Workshop on Web Accessibility and Metamodelling in Grimstad, Norway in 2005, with 15 participants and 5 poster presentations, and participants and invited speakers from Italy, Egypt and Germany as well as Norway. He also co-edited the proceedings from the workshop containing peer reviewed abstracts [published by University of Agder](#) (previously Agder University College). He was Session Chair for a parallel session at [MODELSWARD](#) 2016) and is currently a member of the program committee of [NISK2017](#). Together with co-authors Jaziar Radianti and Weiqin Chen, he has a paper under publication in the proceedings from ITDRR2017 on “*Universal Design of Information Sharing Tools for Disaster Risk Reduction*”.

Dr. Jaziar Radianti is the head of CIEMlab at Centre for Integrated Emergency Management, University of Agder. She has wide research experience in the area of emergency management, mobile sensing technology, and disaster resilience. She has co-authored some papers related to web-Accessibility. She also has laid out a research agenda on usability and accessibility of information visualization, and command and control room for emergency management. In addition, she has done a preliminary research on technology for better access in crisis communication, and methodologies for harmonising crisis terminology. Jaziar has been active and serves as a reviewer in various international conference and journals since 2010.

Weiqin Chen is Professor at department of computer science at Oslo Metropolitan University and leader of the research group for Universal Design of ICT. She has many years of teaching and research experiences in human computer interaction, assistive technology, and universal design of ICT. She has organized and chaired a number of conferences, workshops, special sessions/tracks, panels, and other academic events, including executive chairs for ICCE 2015-16, workshop chairs for LA 2014-7, EP4LA series, Doctoral Student Consortium chairs and co-chairs for ICCHP2018 and ICCE2011-14, local organization committee for Design Education 2012.

All three co-authors are co-chairs of Track T9 Universal Design of ICT in Emergency Management, and plan to participate in the conference and contribute to sessions connected to the proposed track as well as the poster presentation.



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