

The Research Group  
**Web & Information Systems Engineering (WISE)**

has the honor to invite you to the public defense of the PhD thesis of

**Sandra Trullemans**

to obtain the degree of Doctor of Sciences

Title of the PhD thesis:

**Enabling and Informing the Design of Cross-Media  
Personal Information Management Solutions**

Promoter:

Prof. Dr. Beat Signer (VUB)

The defense will take place on

**Tuesday, February 27, 2018 at 17:00 h**

in Auditorium D.2.01 at the campus  
Humanities, Sciences and Engineering of the  
Vrije Universiteit Brussel, Pleinlaan 2 - 1050  
Elsene, and will be followed by a reception.

**Members of the jury:**

Prof. Dr. Olga De Troyer (VUB, chair)

Prof. Dr. Bart de Boer (VUB, secretary)

Prof. Dr. Wouter Verbeke (VUB)

Prof. Dr. Kris Luyten (Hasselt University)

Dr. Stephann Makri (City, University of London)

Prof. Dr. Beat Signer (VUB, promoter)

**Curriculum vitae**

Sandra Trullemans got a Master of Science in Applied Sciences and Engineering: Applied Computer Science (VUB) in 2013 and a Bachelor in Management Science (OU) in 2012. She continued her studies by starting her PhD research on the design of IT solutions which help users during the re-finding of digital and paper documents. Her research has been funded by the Agency for Innovation by Science and Technology in Flanders (IWT). The results of her research were published at various peer-reviewed top international conferences. Sandra was also co-founder of the NSE PhD Network and is currently working at EY Subsidia.

**Abstract of the PhD research**

A large amount of personal information such as documents or photos are obtained, stored and reused on a daily basis. Although there are several applications that make organising this information easier, we are still experiencing difficulties in retrieving them. The most common cause of the ineffective search process is the fact that documents are spread across different applications, devices and cloud platforms. In addition, we still use a non-negligible amount of paper documents ranging from notes to professionally related documents. This gives even greater fragmentation of personal information leading to a significant inefficient search process when both digital and paper documents are needed during a particular task or meeting.

In this dissertation we are looking for solutions that can improve the search process with regard to personal digital and paper documents. Hereby, we introduce the vision of cross-media PIM user interfaces. These user interfaces are designed based on three fundamental principles. First, they must allow the user to discover contextual, temporal and spatial relationships between digital and paper documents so that synergy can be achieved with the human reasoning process during the search activities. In addition, they must be integrated into existing software applications such as the File Explorer as well as made available in the form of digital augmentations of physical artefacts such as filing cabinets or ring binders. Finally, the different user interfaces that a user has installed need to communicate with each other about the status of the search process. This allows the user to easily switch between user interfaces, spread across the digital and physical environment, without interrupting the search process. In this manner, the File Explorer can, for example, provide the user with paper documents related to their current task. In addition, the physical position of these paper documents can be shown in a filing cabinet by means of integrated LEDs in the folders situated in this file cabinet. In this regard, the user can find the necessary paper documents at once.

The design of three software platforms enabled us to implement various examples of cross-media PIM user interfaces. These user interfaces allowed us to gain a deeper insight into the added value for the user. We can observe that the search process is more efficient and that users discover relationships between digital as well as paper documents, which leads to an implicitly valuable knowledge build-up from personal documents. The research results also allowed us to determine various design guidelines for future implementations of our vision in the market.

The developed software platforms can also be used individually for other purposes. For example, the DocTr platform, which can determine when digital and paper documents have been used and where they are located, can also be very useful as a tool in libraries. On the other hand, the CMT platform, which finds out which documents were used during a specific task, can also be used to allow the user to program their smart home. This versatile applicability of the individual software platforms brings a very valuable extra dimension to the outcome of this dissertation.

We demonstrate how we can innovate office environments from a vision that considers human thinking and behaviour as a foundation, which is in contrast to many existing approaches where humans have to adapt to technology.