TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY

Materialising memories

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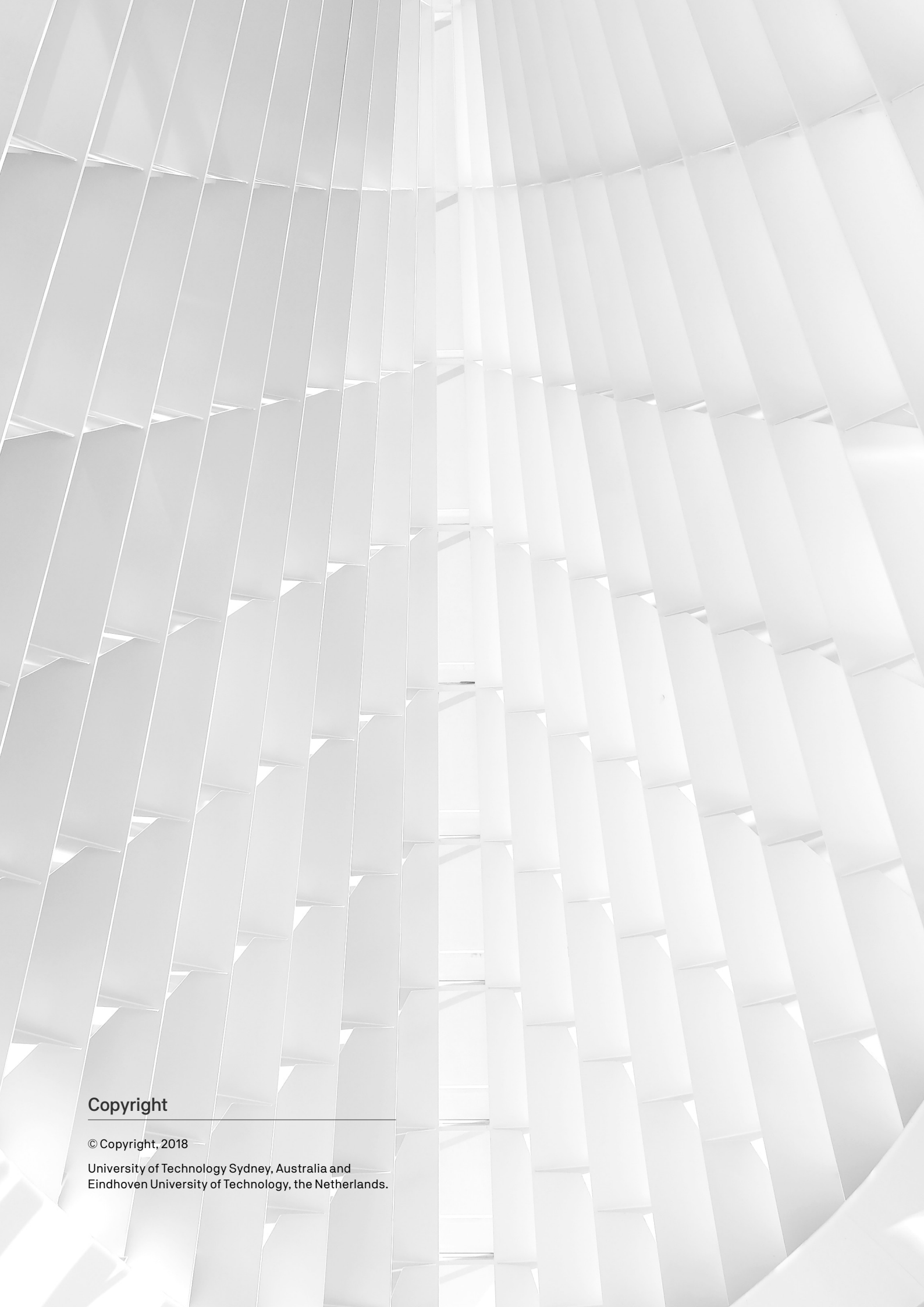

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Unless otherwise stated, all images produced by Materialising Memories research program.

Foreword

Kees Dorst

MEMORIES THAT MATTER

Some things do not change – as long as humans have been around (and Homo Sapiens was indeed Sapiens) we have used objects in our environment to remind us of things that have happened, or of things that we should not forget to make happen. The processes of remembering and forgetting are crucial to who we are, and the props that we surround ourselves with play an important role in holding on to our identity and they help us function within our complex lives.

Other things do change – technology has given us the opportunity to develop a vast memory in the digital world, too. A hyper-memory where nothing gets lost. Yet this is not just a switch of medium, from physical to digital: a digital memory is not without its drawbacks. While the interaction with objects is a more or less natural process (the bag that you put next to the door, so you won't forget to take the next day) we need to understand these interactions much more deeply in order to design a way to deal with the objects in our new digital and hybrid (both digital and physical) environments.

The Materialising Memories research program was sparked by the realisation that with increasingly ubiquitous media creation devices, such as camera phones, creation of personal media is no longer the problem but curation and retrieval are. Most media are used as memory cues - but with media retrieval failing, human memory is not well supported at all. This program investigates the effects of physical and digital media, their creation and curation on memories in everyday life. That knowledge is used to design, implement and evaluate interactive systems that facilitate remembering and forgetting.

This is highly timely. With the advent of digital technologies like blockchain (that doesn't forget a thing) we need to understand how we can be in control of our processes of remembering and forgetting – individually, and as a society. If we don't understand the human side and the human implications of such technological developments, they will influence us in ways beyond our control.

Professor Kees Dorst is a specialist in design expertise, research and practice. He has published extensively in relation to design.

"An integrated academic design and experimental research practice that comes from the collaboration between UTS and the TU/e can be found in the 'Materialising Memories' project...in this case, academic design takes the role of operationalising research from science and technology."

Program Lead

Elise van den Hoven

"In essence, metaphors of memory are museological constructs, encouraging us to imagine memory as the ability to preserve something, preferably everything, wholly intact. That this seems utterly logical is precisely the problem. Because in truth memory is dominated by forgetting."

Douwe Draaisma

I'm very proud to present to you the inaugural edition of this report on the establishment and activities of Materialising Memories (MM) Research Program.

It showcases the research undertaken which aims to understand everyday remembering practices and how these can be supported. As you will see, MM covers a multidisciplinary field with members from a range of backgrounds, including design, computer science, art and psychology. We also come from different locations, as MM is based in three universities and three countries: University of Technology Sydney (UTS), Australia, Eindhoven University of Technology (TU/e), the Netherlands and University of Dundee (UoD), Scotland, UK.

After more than 10 years of design research to support remembering working with Berry Eggen and the Phenom team at Philips Research, I founded Materialising Memories in July 2013. MM has grown steadily in its number of members, topics covered and impact. Some of the highlights are:

Organisational impact: Setting up a joint PhD program between UTS and TU/e, with Doménique, Annemarie and Mendel being our first graduates (read more on page 14);

Academic impact: We achieved success at The ACM CHI Conference on Human Factors in Computing Systems. CHI is the premier international conference of Human-Computer Interaction and one of the top publication venues for work in our field. We had two CHI-papers, two CHI-workshops, and a CHI-demo in collaboration with the Museum of Broken Relationships;

Societal impact: We have an ongoing collaboration with health care institutes and an increased voice in the media (read more at www.materialisingmemories.com);

Educational impact: MM hosts eminent international visitors, academics, designers, industry professionals, and students undertaking research internships, and we teach and supervise students at affiliated universities (read more on pages 18-21).

In this report we aim to provide a brief introduction to the research program. We invite you to visit our website and contact us, whether you would like to learn more about individual projects, team members, the ongoing program or wish to collaborate with us, we would love to hear from you.

Enjoy.
Elise van den Hoven

Materialising Memories

Materialising Memories is a research program that investigates the effects of physical and digital media on memories in everyday life. It explores how personal media, such as photos, audio and visual recordings, are used and how and why people want to relive or forget memories.

Using a research-through-design approach, Materialising Memories investigates how physical and digital media can support and facilitate remembering and forgetting in the everyday, particularly during and after major life events, and for those with memory impairments.

The project investigates remembering and forgetting—both results of the same process. It explores the effects of physical and digital media and the creation and curation of memories in everyday life.

We explore people's intentions for how to remember experiences, how they can be matched with specific media types, and the long-term effects on remembering and forgetting.

We explore how to create less, but more appropriate media through the development of interactive prototypes to support memory.

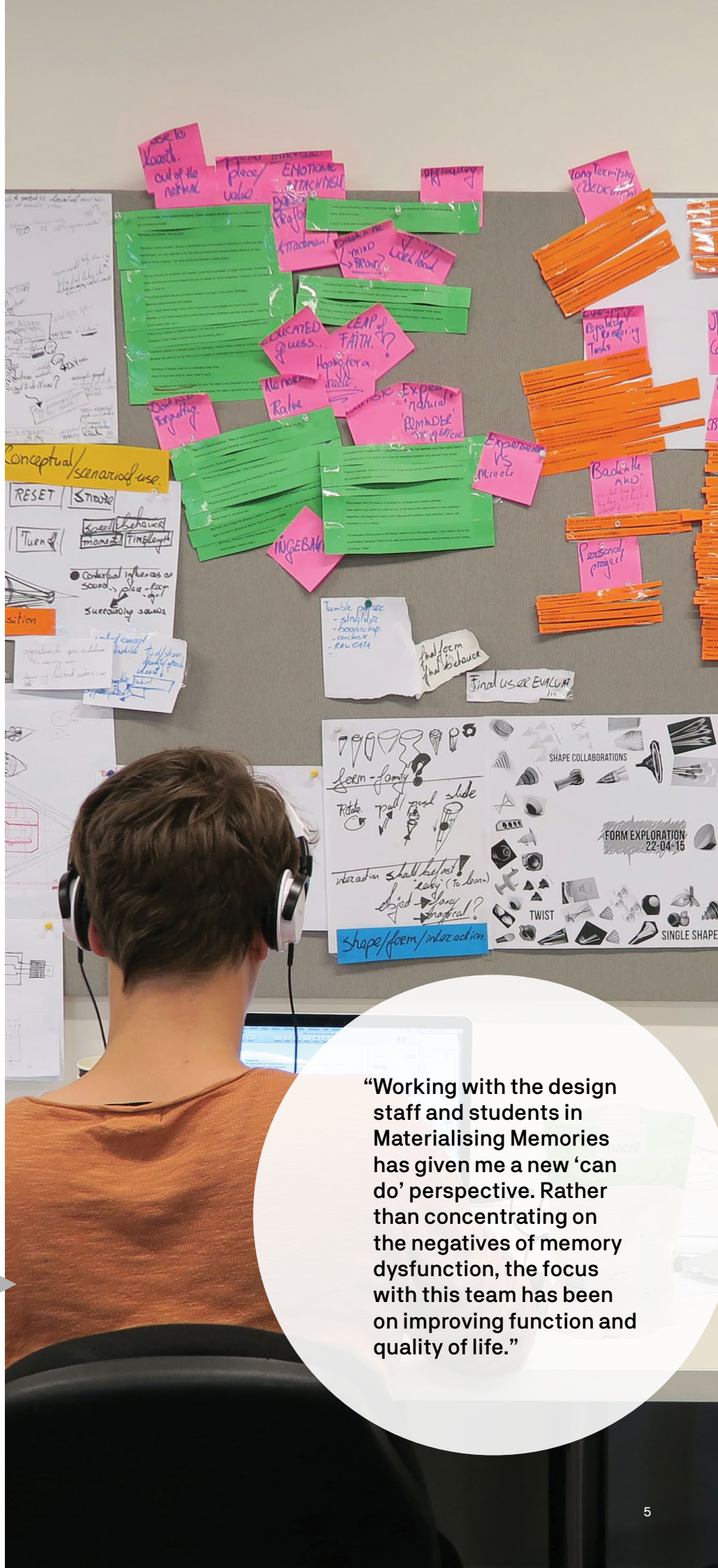
As part of the Materialising Memories research program a collaboration was set up between University of Technology Sydney (UTS) and Eindhoven University of Technology (TU/e) in the Netherlands to explore how people use personal images recorded by digital cameras and phones and use physical objects as cues to help them remember the past or allow for positive forgetting. The research results are used to support the reliving of personal memories.

The project includes a joint PhD program and was formalised with the signing of a Memorandum of Agreement between the two universities. Both Universities also engage in close collaboration with University of Dundee through the Materialising Memories research program.

The program lead, UTS Professor Elise van den Hoven, also has a part-time appointment in the Future Everyday Research Group, headed by Professor Berry Eggen, in the Industrial Design department at TU/e. It was this initial collaboration which instigated the overall program.

Figure 1: Signing the Memorandum of Agreement between the two universities. Image courtesy Iris Soute.

We investigate the role of forgetting, by exploring how to reduce the amount of media archived and people's intentions for media curation to enable forgetting.



"Working with the design staff and students in Materialising Memories has given me a new 'can do' perspective. Rather than concentrating on the negatives of memory dysfunction, the focus with this team has been on improving function and quality of life."

Projects

INTENTIONAL FORGETTING AND ACCIDENTAL REMEMBERING

GAIL KENNING

The importance of remembering, and not forgetting, is paramount today. Media, devices, and a renewed focus on story-telling encourage us to 'capture' memories and to 'hold on to them'. Neurological disorders such as amnesia and dementia cause alarm because they appear to threaten the essence of who we believe we are – our memories. However, forgetting is a healthy part of brain activity, and what we forget and remember, and when and how, reflects concerns, needs and priorities.

Auto-ethnographic approaches enable us to understand what we remember and what we forget in our everyday lives. This project used simplified 'life-logging' approaches over a period of time to analyse memories of the days' activities at the end of each day, after a week, and after a month.

The research raises issues around what is irretrievably forgotten and what is temporarily forgotten, and what is seemingly forgotten only to be remembered when triggered by a person, sensation, object, experience or word. The work builds on understandings of the differences between recall and remembering. It shows how acknowledging differences in memory can support the recognition of personhood in people living with dementia—who have impaired explicit memory, but where implicit or emotional memory is retained.

Figure 2: 'Life logging' and participatory workshops explore forgetting and remembering, 2018.

WATCHING FOR YOU AND PHOTOTYPE

DOMÉNIQUE VAN GENNIP

The research focused on the position of photographs in everyday reminiscing practices, in particular through the design process towards a system that would display photos for people to watch. The intention was to place the design artefact in a place where people could see specific photos every now and then. This gave rise to the question as to why similar attempts (both in the commercial world and academia) met with little enduring success. It seemed that people were not able to dedicate time to look at their photos and, paradoxically, felt a sense of guilt as a result. The solution was to make a 'system' which could display and view photos on their behalf.

Watching for You arose out of this concept. It displayed photos on a screen, while a camera watched. Two images were shown at once, and the camera head moved from left to right as it revealed its' gaze in action. The 'viewing robot' could be directed towards images that were considered more interesting, and so over time it could learn what images were preferred and shift its focus accordingly.

The automated viewing of a private photo collection generated a strong response. It was thought to be a violation of privacy and revealed a general uneasiness about lack of control. As the work developed, the 'interventionist' role of the technology was softened, and the role of viewing photos was again allocated to humans through the use of a photo prototype, or 'phototype'.

Figure 3: The research started with a 'robot' that could "view images for you." Doménique van Gennip.

Figure 4: The research project then returned the role of viewing to humans. Doménique van Gennip.

DESIGN TO SUPPORT REFLECTIONS ON EVERYDAY LIFE

INE MOLS

Balance, Cogito and Dott are three designs exploring modalities of reflection, audio, text and visual. The designs were developed with an open-ended approach. The designs do not prescribe when or how reflection should occur or the topics for reflection.

Balance is a personal audio recorder to be used in the home. An abstract form acts as a visual indicator of the balance in a person's life. Each side of the balance is allocated a meaning, such as, 'work and home' or 'positive and negative'. By tapping one side of the form the recorder is activated and an audio message, which acts as metaphorical 'weight' is added. To balance the form a recording needs to be added to the other side, causing the user to reflect on their chosen priorities.

The designs were deployed in real-life settings, where the impact of the open-ended approach and the ambiguity in the designs could be interpreted. For example, *Balance* became personally meaningful, it stimulated reflections about balancing priorities and prompted users to consider multiple perspectives.

Designing and developing concepts grounded in theory and empirical understanding, to a level where they can be evaluated in the homes of people, is a challenging endeavour. But the valuable interviews and rich insights which come from it, make it worth the effort.

> "It is a wonderful experience to see people use your designs in a way that provides meaning in their everyday life, that contributes to reflection and to personal growth."

Figure 5: Left to right, Dott, Cogito and Balance. Ine Mols.

CURATION-IN-ACTION TO SUPPORT SHARED REMEMBERING

MENDEL BROEKHUIJSEN

The Curation Arena facilitated *Curation-in-Action*, a shared curating experience between two people. The process allowed for photo sharing of shared adventures. Each user had a tangible interface which enables them to navigate the content individually. The user interfaces did not prescribe the curation behaviour such as, the specific number of photos to be shared. To retain focus on the shared story and to promote reciprocal sharing in the Curation Arena, the content from both participants was juxtaposed on the shared screen to form a collage of what they wanted to show to each other.

To implement a reciprocal photo sharing experience, no distinction or hierarchy was made between different users. The tablet interfaces were designed to be identical: it is only the social interaction which determines if the user's current role is, for example, 'narrator' or 'recipient' of content. *Curation-in-Action* and what appeared on the shared screen were often determined by the conversation taking place in the curation arena throughout the process.

Figure 6: Curation in action at the data arena, University of Technology Sydney.

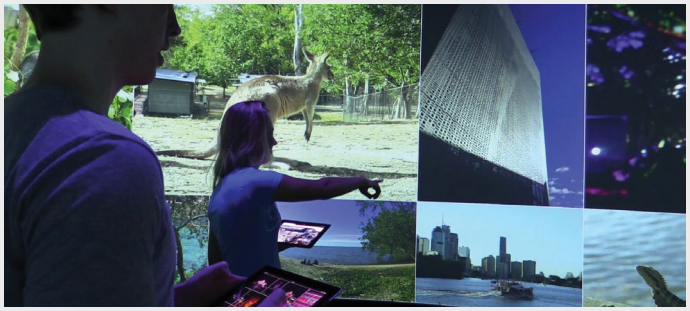


Figure 7: Curation in action. Users are able to narrate and receive content simultaneously.

Projects (continued)

PERSONAL POSSESSIONS AS CUES FOR AUTOBIOGRAPHICAL REMEMBERING

ANNEMARIE ZIJLEMA

The item-memories relationship is personal and ever-changing. The memories cued by an item today, may not be cued by the same item tomorrow. Where an item is placed and the characteristics associated with it may change and so owners may respond to it in a different way. Furthermore, owners themselves may grow and change, as well as their memories.

The first encounter with a personal item often becomes a prominent memory. For example, items first obtained on holiday or at an important event are strongly associated with that time and place. Intended and unintended changes to an item, such as traces and marks due to wear and tear, or ageing, and changes made by moving the item temporarily or permanently to a different place can give rise to new associations and memories.

While souvenirs and photos are typically kept as cues for remembering, a great variety of personal possessions for everyday use, such as clothes and kitchen utensils, can act as a memory cues. These physical items often change roles and serve multiple purposes. They are often changed from being in use and on display, to not being used at all or hidden away. Digital items often have parallel uses, and may be available on different platforms at the same time.

Events that are on a person's mind, their emotional state and their attitude may affect the response cued by personal possessions. This impacts the memories that come to mind, and other details of the memory.

The types of responses cued by items can be categorised in four ways in terms of what they stimulate:

1) 'no-memory' responses;

2) 'knowledge' responses;

3) 'reflection' responses, such as thoughts, feelings, or judgments;

4) 'episodic memory' responses.

The research has contributed to an increased understanding of cued remembering, the dynamic nature of the item-memories relationship, and ways in which cuing can be facilitated or hampered. This knowledge can be used in the design of systems that enable personal possessions to facilitate desired cued remembering.

DIGITAL SEPARATIONS

DANIEL HERRON

*Digital Separation*s explores what happens to digital materials that serve as memory cues, and a person's curated online representation of self, when a long-term relationship ends. Throughout a romantic relationship, a couple often create and accumulate shared digital possessions such as videos, photos, and chat histories that cue important memories. But, after a break up these possessions need to be dealt with in some way.

People's attitudes towards digital possessions can change over time, they are not always simply positive or negative. Some digital possessions are considered "tainted," because of their association with an ex-partner and impact on what might otherwise be positive memories. For example, it may not be possible to share meaningful photographs taken on a trip with an ex-partner, with a current partner, despite how meaningful the journey was. We need to understand the importance of forgetting, in relation to digital possessions, as well as remembering.

This research explores how memory cues are managed by people after they experience a break up, separation or divorce. It aims to generate improved methods of interaction to support individuals in dealing with their digital possessions, by designing effective ways to aid people in finding closure. The project provides opportunities for people to confront and curate their possessions.

> "One of the best things about being part of Materialising Memories is that I've had the opportunity to connect with researchers from all over the world."

DESIGNING MEANINGFUL OBJECTS

DANIEL ORTH

We each possess certain objects that are dear to us for a variety of reasons. They can be sentimental to us, bring us delight through their use or empower us. Throughout our lives, we use these cherished possessions to reaffirm who we are, who we were and who we wish to become.
This research explores the design of objects that develop emotional significance for their owner. Using design-centric methodology, the research examines the link between an individual's self-identity and their cherished objects to better understand the role of these objects and reasoning behind their significance. Objects partly or wholly comprised of digital components play an increasingly central role in our everyday lives, however, their ability to form emotional bonds with users is inadequate when compared to physical objects. This research also looks at the differences between the physical and digital medium of objects to explore ways in which designers can create cohesive physical-digital objects that are meaningful to users.

Figure 8: *Diramu* Lit. Daniel Orth.

Figure 9: *Melo objects*. Daniel Orth.

DESIGNING INTERACTIVE PERSONAL JEWELLERY

MAARTEN VERSTEEG

The research focuses on digital jewellery as a physical memory cue. Maarten is particularly interested in the way (digital) jewellery can support people in regaining psychological well-being after a life-event. The social cultural meaning of jewellery and the way we interact with jewellery are at the core of his work and he tries to build upon this by adding electronics to the pieces.

Memento is a piece Maarten have been working on with Karin Niemantsverdriet (TU/e). The soundlocket can be opened on two sides. Opening one side starts recording. Opening the other side plays back the recordings. The locket needs to be held close to the ear during play-back. Samples that are rarely listened to will diminish and ultimately disappear from the lockets memory.

Figure 10: *Memento*. Maarten Versteeg.

Figure 11: *Memento* records and plays back sound samples.

The Materialising Memories Experience

"We were overwhelmed by the many rich descriptions of beautiful mundane memories. Childhood rituals that made brushing one's teeth a moment of family conversation. Or a father's guitar lullabies that sparked a new generation's interest in music. These valuable memories of other people's lives, still influence how I perceive my present everyday experiences."

"A realisation I've had is the importance of carefully designing how research queries are brought to participants. Helping participants better express their thoughts has been key to understanding their experiences providing thought-provoking insights. The design of a study can be equally as creative as the design practice it aims to inform."

"I think this is really a strength of the Materialising Memories network: finding the sweet spots for innovative research areas by connecting people with different backgrounds."

"The knowledge I've gained from talking to and working alongside the members of the group has been instrumental in shaping my research, and my work is all the stronger for it. One of the best things about being part of Materialising Memories is that I've had the opportunity to connect with researchers from all over the world."

Projects (continued)

DESIGNING FOR THE OTHER 'HEREAFTER'

LAURA RAMOS

Designing to support memory for older individuals is a complex challenge. The understanding of how older adults perceive forgetting in daily life remains limited. This research involves older persons to explore what they forget, how they react, and what mechanisms they put in place to recover from and avoid forgetting. Early findings indicate that an awareness of forgetting fosters internal tensions among older adults, thereby creating opportunities for further design research in how to defuse and normalise these reactions.

The research focused on the experience of forgetting among older adults living independently in metro and regional New South Wales. The study opened the door to the rich world of perceptions about forgetting through narrative enquiry, semi-structured interviews and self-reporting (diaries). The data collected shed light on the types of memories forgotten and the many tactics that older persons use to manage forgetting in everyday life.

Figure 12: 'Memory aids' from a study participant.

Figure 13: A study participant in the Nicholson Museum at the University of Sydney.

INTERACTION DESIGN TO SUPPORT REMEMBERING ACTIVITIES IN MUSEUMS

NATALIYA TARBEEVA

Quality time spent in museums leave traces in people's' lives as experiences and memories. Museums not only display objects but are also communicating with visitors in a variety of ways. Interactive experiences that includes engaging with people tangibly, and through immersive and bodily experiences opens up new ways for museums and galleries to engage. This research explores how we can design for more memorable museum experiences and what are the essential elements that make up a good visit. This research will be of interest to museum curators and exhibit designers who design and produce museum experiences for visitors.

CUES AND CULTURAL INFLUENCES ON CHILDHOOD MEMORIES

XIAOMEI HE

For most adults, childhood seems to be the happiest time in life. Activities based on memories of childhood, and elements in the environment that evoke such memories, make us feel well and balance our emotional needs. During a one-year Fellowship, Xiaomei investigated what childhood memories can bring to mind, how the culture of Chinese-born Australians, as experienced in Australia, influences their childhood memories, and how these cues could relate to their emotions and provide insights for emotional design. This research explored how images can be collected and shared.

The ongoing research eventuated in the development of a camera and portable micro projector which could be worn or used when travelling.

Figure 14: Design for capturing and sharing memories.

University of Technology Sydney

CHERISHED OBJECTS WITH HUMAN TRACES

WENN-CHIEH (JOE) TSAI

Our interactions with objects leave not only traces of use on the objects but also memories in our minds. These human traces are potential memory cues that can trigger our autobiographical memories. The first aim of this project was to investigate the relation between traces, objects, and related remembering experiences. The second was to generate what might be a suitable intervention that can enrich our remembering experience with cherished objects with human traces.

The research studies undertaken at Materialising Memories in Sydney produced a set of research artefacts, Memory Probes, to explore the relationships between the traces of use on personal or shared possessions, and related remembering experiences. The reflexive process of conducting research in a different country, was started by attempting to do a 'local' study from a 'neutral' viewpoint. But, it turned out to be an opportunity for a foreign researcher to become aware of the social and cultural nuances that can be brought to a study. The participatory approach adopted led to an empathetic understanding of shared and inherited memories, and as a result the research focused on Taiwanese immigrant families in Sydney.

Figure 15: Memory probes to explore traces of use on personal or shared possessions, and related remembering experiences.

Eindhoven University of Technology

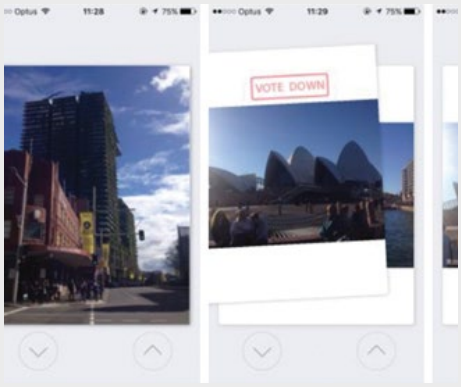


Figure 16: The study compared four interaction methods.

PHOTO CURATION PRACTICES ON SMARTPHONES

XENIA ZURN

With camera-enabled phones always at hand, people tend to build large photo collections on these devices. This creates the need to curate these collections. This research study compared four interaction methods (two existing ones and two newly designed ones) to facilitate on-device curation.

University of Dundee

PERIPHERAL CUEING OF PROSPECTIVE MEMORIES

JAN ZEKVELD

This research focused on the development of devices to prompt memory through peripheral awareness. Working with tangible interaction paradigms and peripheral awareness theories and practices, the project explored how tools can help people to remember future goals, without the use of, what are often, disturbing notification systems. The final concept 'Wobble' is a cone-shaped tabletop device, that acts as a reminder through rolling movements.

Figure 17: *Wobble* prototype. Jan Zekveld.

The Team

ELISE VAN DEN HOVEN

Professor Dr Elise van den Hoven MTD is based in the Interaction Design discipline, Faculty of Engineering and Information Technology, University of Technology Sydney, Australia and a has a part-time appointment in the Department of Industrial Design, Eindhoven University of Technology, the Netherlands.

Elise has two honorary appointments: Honorary Senior Research Fellow at the Duncan of Jordanstone College of Art & Design, University of Dundee, UK and Associate Investigator with the Australian Research Council's Centre of Excellence in Cognition and its Disorders. She leads the international research program Materialising Memories (MM), expedited through a personal fellowship (NWO VIDI, 2012-2018).

Other research interests include human-computer interaction, interaction design, people-centred design and tangible and physical interaction. Elise has been involved in the International Conference Series on Tangible, Embedded and Embodied Interaction (TEI) since its inception and on the Steering Committee since 2008.

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GAIL KENNING

Dr Gail Kenning is a transdisciplinary researcher at University of Technology Sydney. She is a senior researcher in the Faculty of Engineering and IT and Research Associate in the Faculty of Arts and Social Sciences and the Faculty of Design Architecture and Building. She is chief investigator on a range of funded research projects in Australia in partnership with the Art Gallery of New South Wales, The Whiddon Group and The Museum of Applied Arts and Science (MAAS). Gail is Investigator International on AHRC funded research projects in the UK working with Cardiff Metropolitan University and NWO funded projects at Eindhoven University of Technology. Her research focusses on creativity in relation to wellbeing, remembering and forgetting, and arts health engagement in relation to ageing and dementia.

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DOMÉNIQUE VAN GENNIP

Dr Doménique van Gennip is an interaction designer and researcher at the University of Technology Sydney. He obtained a Bachelor in Industrial Design from Eindhoven University of Technology, with a focus on interaction design. At the same university, he completed a Master in Human-Technology Interaction with a thesis that focused on social connectedness and the influence of mediated heartbeat signals. In 2013, he started a joint doctoral degree in the Materialising Memories program which was completed in 2018. His thesis was titled 'Bringing Up The Past: Design for Serendipitous Reminiscing' and investigated how people use and display personal media such as photos. His recent work continues the interest in how interactive products and media influence and benefit reminiscing in everyday life. Doménique is also involved in research that explores how augmented reality can improve professional practice and benefit first aid training. In addition, he has taught university students on interaction design, human-centred research methods, and design thinking. Born in the Netherlands, he currently lives and works in Sydney, Australia.

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INE MOLS

Ine Mols studied Industrial Design at the Eindhoven University of Technology, where she obtained both her bachelor's and master's degrees. During her studies, she developed her skills in combining research and design, exploring novel ways for people to interact with products and systems. Her master's research project "Dear Diary" sparked her interest in designing for behavior change and the subject of everyday remembering. This lead to applying for a PhD within Materialising Memories. In her research, she focusses on supporting people to reflect in and on everyday life. Ine's research also explores the concept of reflection which enables her to explore psychological theories and models, describing how people think, act and feel. The application of reflection within everyday life matches well with her interest in finding ways to appreciate the simple things in life. In her research, she explores how reflection in everyday life can be supported with interactive media systems, creating space for designing, prototyping and building. In her design-research, Ine combines these interests and skills to come to a better understanding of human interaction with designed objects.

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The Team

ANNEMARIE ZIJLEMA

Dr Annemarie Zijlema completed her joint PhD in 2018 in the Materialising Memories at UTS and TU/e program and conducted research on the topic of autobiographical remembering with personal possessions. Through three qualitative studies she the cued responses personal possessions evoke, how the item-memories relationship evolves, and what characteristics of items facilitate cued remembering. She has a background in information science. In 2004 she completed her Bachelor in Information Services and Management at the Hanzehogeschool Groningen, the Netherlands and in 2007 she obtained a two-year international master degree from the Royal School of Library and Information Science in Copenhagen, Denmark (now University of Copenhagen). She worked five years in the field of communication and information, first as a trainee at the European Commission, and later at the Ministry of the Interior and Kingdom Relations in the Netherlands. She also studied psychology at the Open University, which she finished to start her PhD in Sydney. During her PhD she was involved in education at UTS as tutor, lecturer, supervisor, and curriculum developer.

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MENDEL BROEKHUIJSEN

Dr Mendel Broekhuijsen has a background in industrial design, with bachelor and master degrees obtained from Industrial Design, Eindhoven University of Technology. His Master graduation project, titled 'Future Nostalgia' was concluded with the design of an application that enables people to create a personal collection of memory-inducing music. After a year of working as a product manager for Atos Worldline, he returned to the TU/e as a joint PhD candidate, together with UTS, to continue to work on his passion for the value of digital media, this time focused on design for photo curation to support shared remembering. After completing his PhD thesis, titled *Curation-in-Action*, Mendel started working as a designer and researcher at Qwiek in Heerlen, where he works on experience-based products for people with dementia, leveraging his knowledge about media and memories.

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DANIEL ORTH

Daniel Orth is a final-year PhD candidate in the Faculty of Engineering and Information Technology of the University of Technology Sydney. His research focuses on designing for product attachment and the intersection between physical and digital products. He previously obtained a bachelor's degree in Industrial Design at the University of Technology Sydney. Daniel has also worked extensively as an industrial designer, developing design solutions with a range of global retail brands. His research interests include emotional design, self-identity, product consumption and human-centred design. Daniel also teaches product design at the University of Technology Sydney in courses related to emotional design, user-centred design, product sustainability and design research.

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DANIEL HERRON

Daniel is a joint PhD student in the Materialising Memories group, primarily based at the University of Dundee in Scotland, but also studying at UTS. He graduated with an Honours Degree in Applied Computing in 2012, working as a research assistant on several projects before beginning his PhD in 2014. Daniel's current research focuses on how technology can support people in managing their digital possessions after a romantic relationship break up. Daniel has collaborated on research with the Museum of Broken Relationships and completed an internship as a UX Researcher at Facebook.

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The Team

LAURA RAMOS

Laura is pursuing a PhD in Human Computer interaction at UTS, exploring the experience of forgetting among older persons and how technology can improve the lives of older persons with memory impairment and their carers. She has MA degrees in Communications and Asian Studies from the University of Hawaii at Manoa (supported through a Research Fellowship from the East-West Centre in Honolulu), an MBA from the Australian Graduate School of Management at the University of New South Wales and a BA in Liberal Studies from New York University. Outside of her academic research, Laura has spent much of the past two decades leading delivery of digital services in the public sector as well as in financial services, consulting, media and entertainment industries. She is passionate about applying inclusive design practices to deliver great digital experiences and about harnessing technology to deliver change. Her current research is based on her professional background as well as her personal experience. Laura's mother has been living with dementia at her home in San Juan, Puerto Rico. Memories of older relatives with both exceptional and fading memory are a part of her family history.

MAARTEN VERSTEEG

Maarten obtained a Bachelor and Master in Industrial Design Engineering at Delft University of Technology. During the master's phase of his studies, he composed an individual curriculum with courses from Industrial Design, Architecture, Art History (at Leiden University) and Retail Design (Piet Zwart Institute). He then trained as a goldsmith. After graduating he started his own jewellery brand Brech, focusing on the application of innovative materials, production methods and concepts in jewellery. As a part-time lecturer-coach at Eindhoven University of Technology, Maarten became interested in the combination of jewellery and electronics. In 2016, this led to the start of his PhD research 'Designing Interactive Personal Jewellery', supervised by Professor professor Caroline Hummels and Professor Elise van den Hoven.

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NATALIYA TARBEEVA

Nataliya Tarbeeva is a PhD candidate in Interaction Design in the Materialising Memories research group at the Faculty of Engineering and IT, University of Technology Sydney. With a background in language, cognitive psychology, and interactive museum exhibits, Nataliya continues her interest in the experiential side of museum visits. As part of the international research program team Materialising Memories, Nataliya explores the world of interaction design and its role in helping us support remembering activities in application to museums. She is supervised by Elise van den Hoven and Andrew Johnston.

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Advisors

BERRY EGGEN

Professor Dr Berry Eggen is a a full professor of Design for User Experience in Ambient Intelligent Systems, he heads the Future Everyday group, and he is a member of the board and director of research of the Department of Industrial Design at the Eindhoven University of Technology. In addition, he is adjunct professor at the School of Software, FEIT, at the University of Technology Sydney. Berry has an interest in ubiquitous computing, multimodal interaction (including intelligent lighting and sound design) and seamless interaction design for everyday life. He has a background in physics, perception and HCI. Berry supervised Ines Mols and Annmarie Zijlema in the Materialising Memories research program.

PANOS MARKOPOLOUS

Professor Dr Panos Markopoulos is a computer scientist working in the field of Interaction Design. He studied in the National Technical University of Athens and was awarded a PhD in Computer Science at Queen Mary University of London. His research expertise spans several topics including software engineering methods, ambient intelligence, awareness systems, privacy, rehabilitation technology, wearable technology, persuasion and interaction design for children. He is a Professor of Industrial Design at the Eindhoven University of Technology, and is an adjunct professor at the University of Technology Sydney. He is co-author in more than 200 peer reviewed publications. He is a founding editor of Elsevier's *International Journal on Child Computer Interaction*, chief editor of *Behaviour and Information Technology* by Taylor and Francis and an author of *Evaluating Children's Interactive Products* published by Morgan and Kaufmann. Panos supervised Domenique van Gennip and Mendel Boekhuijsen.

WENDY MONCUR

Professor Wendy Moncur is a Professor in Socio-Digital Interaction at the University of Dundee, where she leads the Living Digital group. She is also a Visiting Scholar at UTS and Visiting Fellow at the Centre for Death and Society at the University of Bath. Intrinsically interdisciplinary, yet grounded in computing, her research program focuses on the design of technology to support being human in a digital age. Wendy visited the Materialising Memories lab as a Key Technology Partner Visiting Fellow in September-October 2014, and co-supervises Daniel Herron with Elise van den Hoven. She is Principal Investigator on the EPSRC-funded research program 'Charting the Digital Lifespan', which investigates how the digital is woven into the fabric of people's lives across three transition points. Wendy's research has also explored the design and use of technology during other significant points across the human lifespan–serious illness, becoming a carer, end of life, and bereavement.

CLEMENTINE THURGOOD

Dr Clementine Thurgood has a background in psychology and psychophysiology after obtaining her bachelor's degree at Swinburne University of Technology (Honours). She then completed a PhD in experimental aesthetics at the same university followed by a postdoc in design aesthetics. She is currently a lecturer in the School of Design at the Swinburne University of Technology where she is studying how design methods and tools support changes in (product) meaning for innovation. She is also investigating the relationships between consumer products and the emotions and meanings people associate with them. As part of the Materialising Memories team, she co-supervises Daniel Orth with Professor Elise van den Hoven.

LAURIE MILLER

Born in Pennsylvania, Dr Laurie Miller obtained a BSc (Honours) in Biology and Psychology from Westminster College. In 1987, she completed her PhD in Psychology at McGill University, Montreal and moved to Auckland for a two-year postdoctoral position. Her first "real job" was as a Clinical Neuropsychologist in University Hospital, London Ontario. In 1994, she returned to the antipodes as a Clinical Neuropsychologist/ Senior Hospital Scientist at Royal Prince Alfred Hospital, with a joint appointment in medicine at the University of Sydney. Her research has aimed to understand the nature of memory disorders caused by neurological disorders and to facilitate their remediation.

Visitors and Alumni

JAN ZELKVELD

Jan Zelkveld completed his Bachelor of Science and a Master of Science at in Industrial and Product Design, Eindhoven University of Technology, the Netherlands. He completed is master's project as part of the Materialising Memories, research program at UTS. He is an experienced Industrial Designer and Design Researcher . He is passionate about how balance in objects can act as a driver for interaction with everyday technology.

WENN-CHIEH (JOE) TSAI

Dr Wenn-Chieh (Joe) Tsai has a background in interaction design (PhD), medical informatics (MS) and occupational therapy (BS). He received his PhD in computer science from the Graduate Institute of Networking and Multimedia, National Taiwan University. His research interests lie in the unbalanced relationship between people and their everyday technologies, in particular, remembering experiences and digital memories. He is invested in interaction design encouraging individuals to reflect and regain responsibility in their digital lives.

XIAOMEI HE

Dr Xiaomei He studied mechanical design and theory (PhD and MA) and industrial design (BA) in China University of Mining and Technology. She is currently an associate professor in the Department of Industrial Design, the School of Architecture and Design of China University of Mining and Technology. Her research interests lie in several areas of the fields of ergonomics, emotional design and human interaction design. Now she is mainly invested in the design of emergency products and systems. She is a member of Jiangsu Province Industrial Design Association of China and the reviewer of the *Journal of Packaging Engineering*.

DAVID FROHLICH

Professor Dr David Frohlich is Director of Digital World Research Centre at the University of Surrey and Professor of Interaction Design.

He joined the Centre in January 2005 to establish a new research agenda on new media innovation with social and cultural benefit. Current work includes a mixture of PhD and Research Council projects exploring digital storytelling, personal media collections and augmented paper. Prior to joining Digital World, David worked for 14 years as a senior research scientist at HP Labs, conducting design research on the future of mobile, domestic and photographic technology. He has contributed numerous studies and patents to the field of digital photography, as indicated in two books entitled *'From snapshots to social media: The changing picture of domestic photography'* (2011 with Sarvas) and *'Fast design, slow innovation: Audiophotography ten years on'* (2016).

David has a PhD in psychology from the University of Sheffield and post-doctoral training in conversation analysis from the University of York. He has also held visiting positions at the Royal College of Art, and the Universities of York, Manchester and Melbourne, as well as UTS, and is founding editor of the international journal *Personal and Ubiquitous Computing*.

CONNIE GOLSTEIJN

Dr Connie Golsteijn is a UX designer and previously designed and created interactive physical artifacts as an interaction designer. She moves between physical and digital practices and strives for a 'hybrid' balance, where possible within one project, otherwise across multiple.

During her industrial design BSc and MSc studies at Eindhoven University of Technology, she was 'academically raised' in the field of tangible interaction. She started to combine physical things with digital elements, for example using microcontrollers or incorporating displays. 'Hybrid craft' became the topic of her PhD at University of Surrey in Guildford, UK. Ever since, she has moved between physical and digital worlds, often seeking and shattering the boundary between them, in her attempt to make the world a more hybrid place.

GEKE LUDDEN

Associate Professor Geke Ludden is the chair of Interaction Design, Department of Design, Production and Management and a DesignLab fellow at the University of Twente. She studies how design and interaction influence people's engagement with products and services that aim to support their health and wellbeing. Her three main lines of research focus on prevention (e.g., living a healthier life), cure (e.g., following a therapy) and care (e.g., living at home longer). She is editor of the Journal of Design Research and has published in major design and (e-) health journals such as International Journal of Design, Design Issues and the Journal of Medical Internet Research. She is co-editor of the book 'Design for Behaviour Change' published by Routledge in 2017.

In 2016, she had the opportunity to spend a sabbatical of two months at the Materializing Memories group. In preparation for her visit, she talked with Elise about a shared interest in 'savoring'. Savoring has been defined as the ability to focus on positive emotions and positive events at several points in time. People who savor are generally more resilient in life. It is therefore valuable to explore how the design of interactive technology might support savoring, particularly for people who are not used to practicing it.

University of Technology Sydney

Eindhoven University of Technology

University of Dundee

KRISTIN BEELER

Dr Kristin Beeler is Professor of Art and Coordinator of Jewellery and Metalwork at Long Beach City College in the Los Angeles area.

Solo exhibitions include 'Archive of Rag and Bone' featured at Mesa Contemporary Arts Museum and 'Beauty and Other Monsters' at Velvet da Vinci gallery.

Major group exhibitions include 'La Frontera' at the Museum of Art and Design NY, 'Shadow Themes' at Reinstien/Ross in New York, '(Lost) Paradise' at Alliages in Lilles, France, 'California Handmade: State of the Arts' at the Maloof Foundation, Los Angeles, 'SEIRAAD International Jewellery', Amsterdam, 'La Frontera' at the Franz Meyer Museum, Mexico City and 'Extreme Beauty' at the Glassell School of Art, University of Texas, Houston.

Professional contributions include lectures at the Royal Melbourne Institute of Technology, the Material Matters conference at East Carolina University, La Frontera Symposium in Mexico City, the Northwest Metals Symposium, Seattle, the Society of North American Goldsmiths conference, Houston, the Yuma Symposium and an essay in Metalsmith magazine.

She has been a resident artist at Cleveland Institute of Art, Kent State University and visiting artist at Cranbrook Academy of Art. Currently, she is also a Research Associate at the University of Technology Sydney in the Faculty of Engineering and IT working with the Materialising Memories research program.

XENIA ZURN

Xenia studied Industrial Design at the Eindhoven University of Technology. After completing a bachelor's degree she continued with a master's, when she became interested in doing design research. As part of her master's projects she did a research semester at Materialising Memories in Sydney, where she studied how to stimulate people to curate their digital photo collections on smartphones. In July 2018 she graduated with the project *Reminders in the Home*, which was about combining physical and digital reminders in a reminder system for the home environment.

RENS BRANKAERT

Dr Rens Brankaert is Assistant Professor of Active and Healthy Ageing, with a specific interest in design for and with people living with dementia, at the Department of Industrial Design, University of Technology Eindhoven. Rens applies a design research approach with a person-centreed perspective, and is interested in the impact of design on the healthcare system and all the stakeholders involved. To investigate this, he applies participatory design approaches and living lab methodology. To work on this in the context dementia, he has set up the Interdepartmental Expertise Centre for Dementia & Technology at TU/e. Involvement in the Materialising Memories program at UTS was enhanced and facilitated through a Key Technology Partnership Visiting Fellowship in late 2018.

ASHLYN LEE

Ashlyn Lee completed her Bachelor of Industrial Design (Hons) in 2013 with the University of Technology Sydney. Her honours project focused on childhood development and she looked into storytelling, technology, and the importance of physical parent-child interaction during a child's upbringing. In September 2016, Ashlyn joined the Materialising Memories project. Her research focused on the effect of music on memory in the context of interaction design.

DAVID BLEZINGER

David Blezinger has a MA degree in Adaptive Architecture and Computation, and a BA in Industrial Design. He works as a designer and researcher, integrating disciplines such as product design, interior design, architecture, interface design and interaction design with the goal of creating solutions that meet human needs and inspire the users.

OTHER VISITORS INCLUDE:

Annika Hinze

Corina Sas

Prof. Dr Ir Ben Schouten

Prof. Dr Amanda Barnier

Prof. Dr John Sutton

Dr Celia Harris

Conferences and Publications

The Materialising Memories researchers have produced a large number of articles and conference presentations. Here is a selection. More information can be found at **www.materialisingmemories.com** or by searching by author name online.

Design & remembering

Hoven, E. van den (2014). A future-proof past: Designing for remembering experiences. *Memory Studies*, vol. 7 (3), pp. 373-387.

Hoven, E. van den (2014). Remembering in everyday life: opportunities for design. *Tijdschrift voor Human Factors*, vol. 39 (4), 2014, pp. 31-34.

Hoven, E. van den and Eggen, B. (2014). The Cue is Key: Design for Real-Life Remembering. *Zeitschrift für Psychologie*, vol. 222 (2), pp. 110-117.

Remembering & reflection in everyday life

Gennip, D. van., Hoven, E. van den., and Markopoulos, P. (2015). Things that Make Us Reminisce: Everyday Memory Cues as Opportunities for Interaction Design. *CHI'15*, Seoul, Korea, pp. 3443-3452.

Mols, I., Hoven, E. van den and Eggen, B. (2016). Ritual Camera: Exploring domestic technology to remember everyday life. *IEEE Pervasive Computing*, vol. 15 (2), pp. 48-58.

Mols, I., Hoven, E. van den and Eggen, B. (2016). Technologies for Everyday Life Reflection: Illustrating a Design Space. *TEI'16*, Eindhoven, the Netherlands, pp. 53-61.

Mols, I., Hoven, E. van den and Eggen, B. (2017). Balance, Cogito and Dott: Exploring Media Modalities for Everyday-life Reflection. *TEI'17*, Yokohama, Japan, pp. 427-433.

Zekveld, J., Bakker, S., Zijlema, A. and Hoven, E. van den (2017). Wobble: Shaping Unobtrusive Reminders for Prospective Memories in the Home Context. *TEI'17*, Yokohama, Japan, pp. 31-35.

Personal media, shared media & remembering

Hoven, E. van den, Broekhuijsen, M. & Mols, I. (2018). Design Applications for Social Remembering. In: Meade, M. L., Harris, C.B., Van Bergen, P., Sutton, J., and Barnier, A. J. (Eds.), *Collaborative remembering: Theories, research, and applications*. Oxford University Press, pp. 386-403.

Broekhuijsen, M., Hoven, E. van den and Markopoulos, P. (2017). From PhotoWork to PhotoUse: Exploring Personal Digital Photo Activities. *Behaviour & Information Technology*, pp. 754-767.

Broekhuijsen, M., Hoven, E. van den and Markopoulos, P. (2017). Design Directions for Media-Supported Collocated Remembering Practices. *TEI'17*, Yokohama, Japan, pp. 21-30.

Materials & memories

Zijlema, A., Hoven, E. van den and Eggen, B. (2019). A qualitative exploration of memory cuing by personal items in the home. *Memory Studies*, pp. 1-21.

Orth, D., Thurgood, C. and Hoven, E. van den (2018). Designing Objects with Meaningful Associations. *International Journal of Design*, vol. 12 (2), pp. 91-104.

Versteeg, M., Hoven, E. van den and Hummels, C. (2016). Interactive jewellery: a design exploration. *TEI'16*, Eindhoven, the Netherlands, pp. 44-52.

Tsai, W.-C., Orth, D., and Hoven, E. van den (2017). Designing memory probes to inform dialogue. *DIS'17*, Edinburgh, UK, pp. 889-901.

Memories & significant life events

Ramos, L., Hoven, E. van den and Miller, L. (2016). Designing for the Other 'Hereafter': When Older Adults Remember about Forgetting. *CHI'16*, San Jose, USA, pp. 721-732.

Herron, D., Moncur, W. and van den Hoven, E. (2017). Digital Decoupling and Disentangling: Towards Design for Romantic Break Up. *DIS'17*, Edinburgh, UK, pp. 1175-1185.

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