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Summary of Research Career and Contributions

I have made fundamental contributions in several areas within natural language processing and user modelling. Early in my career, as a graduate student, my research represented the first major work combining user modelling and text generation in order to automatically generate text appropriate for its intended audience, not just at the vocabulary level. User Modelling and tailoring to a user, also known as personalisation and "tailored delivery", has had a profound impact in information systems in the last two decades. It is now a common feature, and users often expect it to avoid reading content irrelevant or incomprehensible to them. As a graduate student, I was one of the co-founders of the User Modelling community, now a thriving community with its upcoming 23rd annual conference, while it started with holding only a workshop, every two years. (I am on the board of User Modelling Inc.)

With personalisation now routinely embodied in systems, this is a very active area of research, both to improve its scope and mechanisms and to assess its effectiveness. I personally (and with my team) have continued to do work in this area throughout my career. Recently, while at CSIRO, we were able to demonstrate the feasibility to do tailored delivery in the government domain, a domain which is conservative by nature and in which personalisation had not been applied. Our work showed that people would be happy to provide personal details if they received appropriate tailored information. The work paved the way to Centrelink's implementation of "Payment Finder". With the push towards citizen-centric government, I expect this research area and my work in it to have further impact.

After graduating, I joined Information Sciences Institute (USC/ISI, Marina del Rey, California), a prestigious research institute, especially for research in Natural Language Processing, Machine Learning and Artificial Intelligence more generally. There, I extended my work to discourse planning for dialogue systems, in the context of enabling knowledge based systems to explain their behaviour. My research represented a major innovation in the computational embodiment of discourse coherence theories and user modelling, building on state of the art planning techniques, to design and develop a flexible system capable of producing personalised documents that could be reasoned about. The ability to reason about the generated documents enables a computational system to participate in a meaningful dialogue (as it can "understand" its own utterances). It also enabled the production of coherent and integrated multimedia documents, and, as such, the approach and system have been the basis for a number of other generation and multimodal presentation systems and research internationally, including a major research effort on multimodal presentation research at the German Research Centre for Artificial Intelligence (DFKI), where I was invited in 1989. The work underpinned some of my later research, including work on the automatic production of instructions (sometimes in several languages) and software documentation (in projects funded by the UK's Engineering and Physical Sciences Research Council (EPSRC) and the UK's Department of Trade and Industry (DTI), the European Union Language Initiative (LRE), the Office of Naval Research (ONR, USA). It formed the basis of a major project that we, at CSIRO, carried out for the Boeing Corporation as part of the Wedgetail Early Warning and Control research programme, and of 2 research consultancies for DSTG ([Australian] Defence Science and Technology Group): one in 2004 to help define the architecture for FOCAL (a collaborative multimodal multimedia display environment), still in use in their command and control environment, and, one this year to help them plan a research programme for conversational systems.

Building on my work in discourse planning and producing coherent documents, I started working on the automatic production of coherent multilingual documents (documents produced

simultaneously in several languages from the same underlying representation), as an alternative to machine translation. Twenty years onwards, this work is influencing new multilingual research at the prestigious University of Tokyo, where I was invited as a Distinguished Fellow by the Japanese Society for the Promotion of Science (JSPS) (for two months at the end of 2014 and again for a fortnight in 2015).

I successfully introduced research in natural language at CSIRO when I joined in 1997, working in collaboration with researchers in Human Computer Interaction. This research area has since developed into a fully-fledged research team. One of my PhD students, Einat Amitay, came from the prestigious Edinburgh University specifically to work under my supervision. Work with Einat Amitay was seminal in text summarisation on the web, in the early days of the web. Einat won the best PhD thesis in Computer Science Award for that year.

I was a co-founder of the Australasian Language Technology Association and one of its early presidents. Together with Professor R. Dale at Macquarie University, I was able to bring the two most prestigious international conferences in Natural Language Processing to Sydney as a combined conference (ACL/Coling) for the first time in 2006.

In 1997, I helped create a permanent leading forum for research in intelligent user interfaces: the ACM International Conference on Intelligent User Interfaces (IUI), a yearly event conceived from the start as a highly selective program focusing on the quality of research, and on the value of the contribution of each accepted paper. Since then, the IUI conferences have established the significance and breadth of the field, and have built a valuable reference body that inspires new research every day across the globe. (I have served as a senior reviewer for the conference since its inception and have been its co-technical chair in 2006, with the conference in Sydney.) I chaired the national conference on Human Computer Interaction (HCI) in 2000 and have been the Chair of the professional association in HCI (CHISIG: The Computer Human Interaction Special Interest Group of the Human Factors and Ergonomics Society of Australia) from 2001 until December 2015, receiving the CHISIG medal in 2011.

In recent years, together with my team I pioneered work on social media analysis to help improve government services. The resulting system is in daily use at the Department of Human Services (DHS) Communication team, and it has helped the NSW State Library be at the leading edge of social media collecting and curating. The tool is employed by a number of other organisations and is currently being commercialised. Another social media prototype, the "We Feel" system, was developed in collaboration with the Black Dog Institute and Amazon Web Services. It showed (1) the feasibility to go beyond conventional sentiment analysis and study in real time the "pulse of the country" and (2) the use of social media to study mental health. It was the subject of over 120 media articles upon its launch, reaching an audience of about 1.45 Million people. We are currently developing another system with the Black Dog Institute, this time to automatically and accurately identify from tweets people at risk of committing suicide. This work could have significant impact in mental health.

In summary, throughout my research career I have shown vision, I have made fundamental contributions to my field of research, and I have demonstrated impact for my work, in terms of both science and its outcomes. An important aspect of my work has been its multidisciplinary approach. Already working at the intersection of two areas (natural language processing and user modelling), I have always pushed the traditional boundaries of my research area, working with and sometimes leading researchers in other areas, e.g., Knowledge Management, Machine Learning, Cognitive Science, Knowledge-Based Systems, Knowledge Acquisition, Translation and Translating Studies, Human-Computer-Interaction, Information Retrieval, Multi-Agent

Architectures and Trust Management. My collaborators have included mental health experts and communication staff. Another important aspect of my work since at CSIRO is that it is rooted in practical concerns and the desire to have impact. I have been a very active contributor to the research community, in Australia and internationally, and I have supervised PhD students who have received awards and are having very successful careers.