ERCIM "ALAIN BENSOUSSAN"
FELLOWSHIP PROGRAMME

ERCIM
European Research Consortium
for Informatics and Mathematics

Scientific Report

First name / Family name	Andrew Webb
Nationality	United States
Name of the *Host Organisation*	CWI
First Name / family name of the *Scientific Coordinator*	Pablo Cesar
Period of the fellowship	01/01/2019 to 31/12/2019

I – SCIENTIFIC ACTIVITY DURING YOUR FELLOWSHIP

During my fellowship, I engaged in numerous scientific activities. I designed and conducted user studies to collect data about subjective experiences. I built tools to help collect observational data from online videos. I analysed data using thematic analysis. I wrote papers to disseminate research findings. I collaborated with another ERCIM postdoc fellow, Alina Striner, and a tenure-track researcher in the Distributed and Interactive Systems group at CWI, Abdallah El Ali. My activities were conducted in the following areas: (1) tabletop role-playing games; (2) audience participation for live streaming; (3) privacy in biometric sensing; and (4) service.

Tabletop Role-Playing Games

My primary scientific activities focused on how computing technology supports online, distributed play of tabletop role-playing games (e.g., Dungeons & Dragons). In these games, players take on the roles of fictional characters as they collaboratively create stories while sitting around a table. I sought to identify what challenges exist within this context. Online play of these games situate players in virtual spaces mediated by various web technologies. Understanding this context could more broadly inform design in other creative and social contexts mediated by computing, such as computer-supported cooperative work (CSCW) and social VR.

I conducted interviews with experienced users of virtual tabletop environments. I collected approximately 17 hours of video and audio. I transcribed interviews; I performed thematic analysis on the data to uncover empirical findings; I derived implications for the design of virtual tabletops and tabletop role-playing games. Key findings reveal seams—points where media, activities, and technology intersect—within virtual tabletop environments that enable distributed

players to shift among collaborative storytelling, applying game rules and mechanics, and socially interacting with each other. **Outcomes:** Results are presented in [2] (see next section). I plan to continue working on this topic and publish new findings at relevant conferences.

In conjunction with subjective interview data, I developed a web-based tool to collect observational data by annotating and coding videos of distributed play posted on YouTube. In recent years, players have begun posting videos of their online play sessions for others to watch. These videos provide an excellent source for observing how technology supports this form of play and further what challenges or problems users face as they play. **Outcomes:** Data collection using this tool is ongoing. In the next year, I plan to publish findings for this work. Further, I am looking to open source my tool, so that other researchers may take advantage of it.

I am working with Alina Striner and other researchers from academic institutes in Europe and the United States to develop a methodology for using tabletop role-playing games as tools for critical reflection. Role-playing is already used in design practice to help designers familiarize themselves with end-user needs, activities, and motivations. This research looks to defamiliarize computing technology through role-playing in a fantasy setting. The goal is to help designers overcome potential biases by masking technology with magical metaphors and situating its use in an unfamiliar fantasy context. **Outcomes:** In January, we plan to submit two papers regarding different aspects of this methodology. I will continue my collaborations as we iterate on this methodology throughout the next year.

Audience Participation for Live Streaming

I collaborated with Alina Striner, another ERCIM postdoctoral fellow, on research studying how to design for audience participation on Twitch—an increasingly popular live streaming site where audiences watch and interact with streamers, typically while the streamer plays a video game. We coded and analysed data from student projects in a course on designing for audience participation on Twitch. From our analysis, we developed a map of the audience participation design space on Twitch; we derived a set of guidelines to help researchers, designers, and educators use this map to improve the range of considerations when designing for audience participation for live streaming. **Outcomes:** We plan to disseminate our findings in a paper submission to ACM Distributed and Interactive Systems (DIS) in January. I will continue to collaborate with Alina on this research.

Privacy in Biometric Sensing

I collaborated with Abdallah El Ali, a CWI tenure-track researcher, to understand how well people think different forms of biometric sensing can identify them and how willing they are to share biometric data for different types of benefits. We focused on an automotive context, an emerging domain for biometric sensing that could improve driving safety, prevent theft, and provide personalized experiences. I helped design a card sorting study in which participants categorize how well they think specific biometric sensing can identify them. Results from this studied informed the design of a larger survey that looked at how perceived benefits affect willingness to share biometric data. **Outcomes:** Results of card study are presented in [4]. We are looking to publish survey results at the ACM International Joint Conference on Pervasive and Ubiquitous Computing (ubicomp).

Service

I performed a number of service roles during my fellowship. I served as co-chair for demos and posters for ACM Creativity & Cognition 2019. I reviewed papers for several premiere venues in my domain: ACM Computer-Supported Cooperative Work (CSCW), ACM User Interfaces and Software Technology (UIST), ACM Human-Factors in Computing Systems (CHI), and ACM Transactions on Computer-Human Interaction (TOCHI).

II – PUBLICATION(S) DURING YOUR FELLOWSHIP

Journal

[1] Toups, Z. O., Lalone, N., Alharthi, S. A., Sharma, H. N., & **Webb, A. M.** (2019). Making Maps Available for Play: Analyzing the Design of Game Cartography Interfaces. *ACM Transactions on Computer-Human Interaction*, 26(5), 30:1–30:43.

[Abstract: Maps in video games have grown into complex interactive systems alongside video games themselves. What map systems have done and currently do have not been cataloged or evaluated. We trace the history of game map interfaces from their paper-based inspiration to their current smart phone-like appearance. Read-only map interfaces enable players to consume maps, which is sufficient for wayfinding. Game cartography interfaces enable players to persistently modify maps, expanding the range of activity to support planning and coordination. We employ thematic analysis on game cartography interfaces, contributing a near-exhaustive catalog of games featuring such interfaces, a set of properties to describe and design such interfaces, a collection of play activities that relate to cartography, and a framework to identify what properties promote the activities. We expect that designers will find the contributions enable them to promote desired play experiences through game map interface design.]

Conference

[2] **Webb, A. M.**, & Cesar, P. (2019). Uncovering Seams in Distributed Play of Tabletop Role-Playing Games. In *Extended Abstracts of the 2019 Annual Symposium on Computer-Human Interaction in Play*.

[Abstract: We uncover how geographically distributed players of tabletop role-playing games engage narrative, ludic, and social aspects of play. Our existing understandings of tabletop role-playing games are centered around co-located play on physical tabletops. Yet, online play is increasingly popular. We interviewed 14 players, experienced with online virtual tabletops. Our findings reveal the seams-points where media, activities, and technology intersect-within virtual tabletop environments that enable distributed players to shift among collaborative storytelling, applying game rules and mechanics, and socially interacting with each other.]

[3] **Webb, A. M.**, Spiel, K., Toups, Z. O., Hamilton, B., Lupfer, N., Graeber, R. A., & Mackay, W. E. (2019). Distributed Creativity in Play. In *Proceedings of the 2019 on Creativity and Cognition* (pp. 714–721).

[Abstract: Our objective is to explore distributed forms of creativity that arise in play to help guide and foster supportive research, game design, and technology. This workshop seeks to bring together researchers, game designers, and others to examine theories of creativity and play, game design practices, methods for studying creativity in play, and creative play experiences. Participants will present work, video prototype, discuss topics, and contribute to outcomes.]

[4] Ali, A. E., Ashby, L., **Webb, A. M.**, Zwitser, R., & Cesar, P. (2019). Uncovering Perceived Identification Accuracy of In-Vehicle Biometric Sensing. In *Proceedings of the 11th International Conference on Automotive User Interfaces and Interactive Vehicular Applications*.

[Abstract: Biometric techniques can help make vehicles safer to drive, authenticate users, and provide personalized in-car experiences. However, it is unclear to what extent users are willing to trade their personal biometric data for such benefits. In this early work, we conducted an open card sorting study (N=11) to better understand how well users perceive their physical, behavioral and physiological features can personally identify them. Findings showed that on average participants clustered features into six groups, and helped us revise ambiguous cards and better understand users' clustering. These findings provide the basis for a follow up online closed card sorting study to more fully understand perceived identification accuracy of (in-vehicle) biometric sensing. By uncovering this at a larger scale, we can then further study the privacy and user experience trade-off in (automated) vehicles.]

[5] **Webb, A. M.**, Fowler, H., Kerne, A., Newman, G., Kim, J.-H., & Mackay, W. E. (2019). Interstices: Sustained Spatial Relationships Between Hands and Surfaces Reveal Anticipated Action. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems* (pp. 588:1–588:12).

[Abstract: Our observations of landscape architecture students revealed a new phenomenon—*interstices*. Their bimanual interactions with a pen and touch surface involved various sustained hand gestures, interleaved between their regular commands. Positioning of the non-preferred hand indicates anticipated actions, including: sustained hovering near the surface; pulled back but still floating above the surface; and resting in their laps. We ran a second study with 14 landscape architect students which confirmed our observations, and uncovered a new interstice i.e. stabilizing the preferred hand while handwriting. We conclude with directions for future research and challenges for designers and researchers.]

III – ATTENDED SEMINARS, WORKHOPS, CONFERENCES

I attended three conferences: ACM Conference on Human Factors in Computing Systems (CHI), ACM Creativity & Cognition, and ACM Symposium on Computer-Human Interaction in Play (CHI Play). During these conferences, I networked with other researchers, forming a number of new collaborations and research projects.

At CHI, I presented a full paper [5] and held a number of meetings with potential collaborators. We formed a team of researchers that are interested in tabletop role-playing games as a context for research. We submitted workshop proposals to CHI and CHI Play.

At Creativity & Cognition, I ran a workshop on distributed creativity in play [3]. The workshop explored play as a creative context where multiple persons cooperate or compete to accomplish goals, such as winning. We began by discussing aspects of play, creativity, and their intersections. We played an ideation game to see how play can support brainstorming, and video prototyped new interactive experiences involving play and creativity.

Additionally, I served as posters and demos co-chair for Creativity & Cognition. My co-chair, Joy Kim (Adobe Research) and I formed a committee to review submissions. We selected submissions to accept based upon these reviews. During the conference, we organized the poster and demo spaces for the conference reception. To bring awareness of what conference attendees would see at the reception, we hosted a madness session where presenters of posters and demos were given 30 seconds to pitch what they are presenting to the entire conference.

At CHI Play, I presented a poster on how different technologies shape online play of tabletop role-playing games [2]. I formed a number of new connections that will aid in future research. I received valuable feedback to help frame future disseminations of this work.

IV – RESEARCH EXCHANGE PROGRAMME (REP)

I visited Wendy Mackay at Inria for the Research Exchange Programme. I spent my time there collaborating with Wendy, Nicolas Taffin (a designer), and a masters student on preparing a version of their video prototyping tool and associated instruction materials for use in the Creativity & Cognition workshop [3]. We discussed methods for using the tool in the workshop. They provided me with a special version of the application and a tutorial website to help workshop participants in using the tool. Additionally, I consulted with a number of Ph.D. students about their research, providing feedback and potential directions for future work.