

# New research considers future interactions with computer-generated people in virtual reality

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Dr. Rachel McDonnell, Assistant Professor in Creative Technologies at Trinity, focuses on the animation of virtual humans for the entertainment

industry and virtual reality (VR).

Dr. McDonnell has a unique approach to advancing the state-of-the-art in virtual characters that merges new industry-standard technology with results from psychophysical experiments.

She has made a significant impact by exploring the use of novel perceptual experiments in order to guide computer graphics algorithms to achieve higher levels of realism and plausibility, and to investigate the trade-off between available resources (such as computation power, time, and budget) and acceptability.

This approach has both deepened our understanding of how virtual characters are perceived, and directly provided new algorithms and guidelines for industry developers on where to focus their efforts.

She is also currently expanding her research to collaborate (with innovator funding from Science Foundation Ireland) with Trinity's School of Psychology to use virtual characters to improve communication and skills for those with behavioral and developmental problems.

Dr. McDonnell recently published research, in collaboration with her postdoctoral researcher, Dr. Katja Zibrek, that explores the importance of high levels of photorealism (where the digital depiction is indistinguishable from a photograph) in VR, and its effect on empathy, social presence and behavior. The article won the Best Paper Award at the recent Symposium on Applied Perception in Barcelona.

Virtual Reality is known for eliciting extraordinarily strong responses in the user. Even a very simple representation of a room creates an [illusion](#) of a real place (place illusion) and makes the user feel as if a virtual human in the room is alive and right there in the room with them (social

presence).

When studying social presence and place illusion, research has not found any consistent evidence that visual realism would intensify these illusions. However, it was also not previously possible to display interactive photorealistic environments in VR without significant loss in rendering speed. Nowadays, due to rapid advancements in real-time performance graphics, virtual characters are coming close to resembling actual people.

Dr. McDonnell said, "In our work, we wished to investigate if this level of realism would have an impact on the observer—would they feel more empathy for a realistic virtual human in a difficult situation than a lower fidelity representation? Would they feel as though the experience of conversing with this [character](#) was real? Would it affect their behavior in the environment? Our experiment was installed in a public setting in the Science Gallery Dublin during the 'Intimacy' exhibition. Almost 1,000 visitors volunteered to take part, making it one of the few large-scale experiments ever conducted in VR. Our results showed that photorealism was a positive choice for [virtual reality](#) despite the large computational cost. Photorealism increased place illusion making observers feel as though the scenario was more real, and affected their emotional responses, but did not affect the behavior of the observers. The results have important implications for the design of interactive [virtual characters](#) (avatars or agents) in VR."

Provided by Trinity College Dublin

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