Motivation
Can awe be elicited through VR?
- Virtual reality (VR) has a major role in the future of communication;
  - There is little known on the effectiveness of interactive VR in provoking profound
    emotions, and encourage lasting, positive change
- 'Awe' is of particular interest as a transformative emotion [1], and can be
  experienced physiologically in the form of chills and goose bumps [2-4]
- The role of interaction in VR on eliciting awe is unknown; VR has the potential
  as both a medium for awe-inspiring experiences and a data collection tool [5]

Hypothesis 1
Head-mounted, interactive Virtual Reality can induce subjective and
physiological events of awe, that correlate with goose bump events
and high awe ratings

Hypothesis 2
An 'flight' lounger interface may be more effective in eliciting awe than a "standing", vertical posture

Methods and Materials
Two conditions: "flight" lounger and "standing" (natural interaction); physiological, survey, and interview datasets
- 16 participants (10 men, 6 women) spent a total of 10 minutes per condition; content was Google Earth VR [6] with HTV Vive
- A video camera recorded goose bumps, participants completed surveys on their feelings of awe after each condition. We conducted a short interview after, with this providing insight and observational data.

Qualitative Results
Body posture and hand controllers counterintuitive; full 360 degrees of VR not utilized
- 15 of 16 participants elected to rest in the "flight" condition in an upright position similar to the "standing" condition, which may explain some of the lack of significant differences.
- 10 of 16 struggled with the controllers; despite a 360 degrees environment, looking around was not intuitive and many relied on controllers to manipulate the environment (a possible artefact of face-forward, seated gaming expertise).
- Verbal indications of awe and wonder were made by all participants.

Conclusions
Through non-intrusive and introspective data collection, these findings demonstrate VR can be awe-inspiring.

To our knowledge, this is the first study to explore whether interactive, head-mounted VR with natural interfaces can elicit awe. Despite the limitations with interaction, findings revealed events of awe and provides insight to future work.

Quantitative Results
Participants rated awe 79.7 (out of 100); 43.8% of participants experienced goose bumps
- Participants who had goose bumps showed significantly higher ratings of awe than those who did not, confirming Hypothesis 1.
  Awe was rated similarly between "flight" and "standing" interfaces, so Hypothesis 2 could not be supported; there was a trend for somewhat more frequent goose bump events for "flight" vs "standing" (see Figure 1), but this trend was not significant.

References

Figure 1 | Goose bump events and awe ratings (means and 95% confidence intervals) within interaction mode (flight vs standing) by gender.