

**ALL CONFERENCE TALKS NEED CAPTIONS.** J.L. Piatek<sup>1</sup>, S.M. Brooks<sup>2</sup>, J.R. Masiero<sup>3</sup>, J.L. Molaro<sup>4</sup>, J.A. Rathbun<sup>4</sup>, and J.H. Roberts<sup>5</sup>, <sup>1</sup>Dept. of Geological Sciences, Central Connecticut State University, New Britain CT ([piatekjel@ccsu.edu](mailto:piatekjel@ccsu.edu)). <sup>2</sup>Jet Propulsion Laboratory/Caltech, 4800 Oak Grove Drive, Pasadena, California, 91109. <sup>3</sup>Caltech/IPAC, 1200 E California Blvd, Pasadena, CA, 91125 ([jmasiero@ipac.caltech.edu](mailto:jmasiero@ipac.caltech.edu)). <sup>4</sup>Planetary Science Institute, Tucson, AZ. <sup>5</sup>Johns Hopkins Applied Physics Laboratory, Laurel, MD.

### Introduction

The pandemic-related switch of conferences scheduled in 2020 and 2021 from physical to virtual has provided an opportunity to address how science presentations can be more accessible. In the Fall of 2020, multiple conferences, including the Fall meeting of the Division for Planetary Sciences (DPS), the national meeting for the Geological Society of America and the Fall meeting of the American Geophysical Union, utilized a format where presenters were instructed to upload pre-recorded videos of their oral presentations in addition to participating in virtual live discussion sections. This allowed presenters to include captions (similar to the closed captions available on television programs) with their talks, providing viewers who are hard-of-hearing with this invaluable resource that is typically unavailable at science conferences. This has the potential for significant impact at both virtual and in-person meetings. Here, we revisit the benefit of captioned presentations and how we can provide not only hard-of-hearing attendees, but all attendees, with these benefits.

### The Case for Captions

Captions provide readable text in addition to the visuals and audio presented by a speaker, and therefore provide additional information for those who have difficulty hearing the presenter, non-native English speakers, and those who process information more easily in text form. This is an essential benefit for audience members who are hard-of-hearing and provides additional benefit for those in the audience who have difficulty hearing due to increased background noise (e.g., seated at the back of the session room or watching virtually while in a noisy location). Statistics from the U.S. Census [1] tabulate nearly 3% of U.S. citizens ages of 35-64 who indicate they have difficulty hearing; this increases to nearly 25% of respondents age 65 or older. Despite these advantages, in-person conferences rarely provide captioning of presentations.

Captions are most accurate when provided by a human, typically referred to as "Communication Access Realtime Translation" (CART) Services. Many of the popular video-conferencing options (e.g., Zoom, WebEx, Microsoft Teams, Google Meet) allow a meeting "attendee" to act as a captioner: this can be a person doing live transcription or a third party plugin using AI software or a pre-written transcript to provide captions. In addition, videos can have captions

attached using specific text file formats that include the spoken text and timestamps for each caption: common formats are WebVTT (.vtt) and SubRip (.srt).

Captions come in two forms: Closed (viewed only to viewers who "opt in") and Open (viewed by everyone). There are advantages and disadvantages to each type, but we recommend conferences provide at least one. Open captions could be presented for all in the room to view on a separate screen/monitor to the side of the presentation or along the bottom of the screen (as is common with closed captioning of online videos and television), while Closed captions would be accessed by those wishing to view them via a personal viewing device or smartphone/tablet application.

AI-generated captions (a.k.a. "auto-captions") use algorithms to interpret spoken language detected in a video to words. In many cases, these algorithms can "learn" words over time and improve the accuracy of the captions, but these algorithms are still imperfect. In particular, algorithms have limited success with technical terms/jargon and acronyms, and may not correctly interpret non-native English speakers or native speakers with certain regional accents, and do not filter background noise as easily as a human captioner [e.g. 2-4]. This was quantified further for science conferences by Cooke et al. [5], who examined the accuracy of auto-captions generated by auto-caption algorithms in commonly used presentation software (Google Slides and Microsoft PowerPoint) for text passages taken from the geoscience literature.

While many virtual conferences encouraged presenters to include captions or upload transcripts, the instructions for providing these were often limited, leaving few options for scientists already pressed for time due to early upload deadlines. The DPS Professional Climate and Culture Subcommittee (<https://dps.aas.org/leadership/climate>) attempted to crowdsource detailed instructions for providing captions/transcripts using a variety of platforms, but schedule constraints prevented the document from being widely advertised: we attempt to rectify that here by linking this document for both viewing and commenting: <http://bit.ly/captions-transcripts>.

### Recommendations

- All conferences should provide captioning via CART for oral presentations as well as related discussion and Q&A sessions. While the cost necessary to hire professional transcriptionists

(\$60-\$200/hr [6]), might be prohibitive for small events, larger meetings such as the Lunar and Planetary Science Conference (LPSC) or DPS could potentially fund CART with a moderate increase in cost per attendee. For a meeting such as LPSC that has ~110 hours of oral presentations/events, the cost of transcription (\$10,000-\$25,000) could be funded by a sponsor or offset by an increase in participant costs of \$5-12.50 per attendee (assuming 2000 attendees): this increase could be added to registration fees or collected via an abstract submission fee.

Alternative recommendations:

- Virtual/hybrid conferences should utilize video-conferencing platforms that include auto captioning or provide captions for attendees who request via CART or a third-party plugin such as <https://webcaptioner.com/>
- Virtual/hybrid conferences should require presenters to include captions in uploaded videos, and provide detailed, clear instructions on how to generate these captions.
- In-person conferences not utilizing CART should utilize auto-captioning from presentation software displayed on the screen below slides or provide the option for attendees to request CART transcription for specific sessions when registering.

#### Additional Resources

The following provide additional information for providing captions from common video-conferencing and presentation applications: this list is far from comprehensive, but does provide a starting point for those looking for further information.

Options for captioning YouTube videos:

<https://www.3playmedia.com/blog/the-difference-between-youtubes-automatic-captions-diy-captions-and-3play-media-captions/>

Instructions for captioning presentations in PowerPoint and Google Slides:

[https://figshare.com/articles/online\\_resource/How\\_to\\_get\\_the\\_most\\_from\\_live\\_auto-caption\\_of\\_presentations/12996719/1](https://figshare.com/articles/online_resource/How_to_get_the_most_from_live_auto-caption_of_presentations/12996719/1)

Additional information on captions in PowerPoint (Mac, PC, or web versions):

<https://support.microsoft.com/en-us/office/present-with-real-time-automatic-captions-or-subtitles-in-powerpoint-68d20e49-aec3-456a-939d-34a79e8ddd5f>

Captions in Google Slides:

<https://support.google.com/docs/answer/9109474?hl=en>

Audio transcripts of recorded Zoom meetings:

<https://support.zoom.us/hc/en-us/articles/115004794983-Using-audio-transcription-for-cloud-recordings->

Auto-captions in Microsoft Teams:

<https://support.microsoft.com/en-us/office/use-live-captions-in-a-teams-meeting-4be2d304-f675-4b57-8347-cbd000a21260>

Enabling closed captions and assigning a captioner in WebEx:

[https://www.cisco.com/en/US/docs/collaboration/CW/MS/2\\_0/User\\_Guide\\_chapter\\_01101.html#task\\_DF16E3DD0B34443BBC2935E4E745D93F](https://www.cisco.com/en/US/docs/collaboration/CW/MS/2_0/User_Guide_chapter_01101.html#task_DF16E3DD0B34443BBC2935E4E745D93F)

#### References

- [1] U.S. Census Bureau, 2016 American Community Survey, tables B18101–B18107, 1-Year Estimates, <https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml>.
- [2] Kafle & Huenerfauth, 2018. Usability evaluation of captions for people who are deaf or hard of hearing. SIGACCESS Newsletter, 122. <http://www.sigaccess.org/newsletter/2018-10/kafle.html>
- [3] Besner, 2019. When is a caption close enough? The Atlantic: <https://www.theatlantic.com/health/archive/2019/08/youtube-captions/595831/>
- [4] Cooke, 2019. Captions and captions for academics. The Mind Hears blog: <https://themindhears.org/2019/05/01/captions-and-crap-tions-for-academics/>
- [5] Cooke et al., 2020. Caption This! Best Practices for Live Captioning Presentations. Eos 101, [doi:10.1029/2020EO150246](https://doi.org/10.1029/2020EO150246).
- [6] What is CART and FAQ's - Find a CART Captioning Provider. <http://ccacaptioning.org/faqs-cart/>.