STEVEN A. CHOLEWIAK, PH.D.

OBJECTIVE

Seeking an applied research scientist position in an industrial research group focused on perceptual science.

CONTACT

University of California, Berkeley	Website:	http://steven.cholewiak.com
School of Optometry, Vision Science	Email:	steven.cholewiak@berkeley.edu
200 Optometry Lane, Room 509		scholewiak@gmail.com
Berkeley, CA 94720-2020	Phone:	1-937-889-9009

RESEARCH EXPERIENCE

Martin S. Banks's Vision Science Research Laboratory   **University of California, Berkeley**
Department of Optometry and Vision Science Program   Berkeley, CA
Assistant Project Scientist (2018-present), Postdoctoral Scholar (2015-2018)   2015 to present

- Studying ocular and image-based depths cues in future AR/VR display technologies.
- Developing and constructing optical testbeds with adaptive focus-tunable optics, Shack-Hartmann wavefront sensors, autorefractors, and varifocal and multi-plane 3D displays.
- Working with industrial research partners in the UC Berkeley Center for Innovation in Vision and Optics (CIVO) on designing and evaluating future AR/VR display technologies and imaging techniques.
- Co-discovered a method of rendering images using chromatic aberration that robustly drives accommodation.
- Extensive research experience designing and conducting psychophysical human subject studies utilizing a number of software platforms and frameworks (Python, MATLAB, Jupyter, Psychtoolbox, Mitsuba).

Roland W. Fleming's Perception Research Laboratory   **Justus-Liebig-University Giessen**
Department of Experimental Psychology   Giessen, Germany
Postdoctoral Fellow   2012 to 2015

- Developed computational models to explain observed strengths and weaknesses of perceived shape from shading and texture using orientation fields using steerable pyramid filters.
- Utilized MATLAB, Psychtoolbox, Python, OpenGL, and WebGL to create interactive experiments and demonstrations, including real-time 3D shape reconstruction from local orientation judgments.

Manish Singh's Perception Research Laboratory   **Rutgers University**
Department of Psychology and Perceptual Science Program   New Brunswick, NJ
Graduate Student   2007 to 2012

- Investigated perceptual representation of variance and found thresholds were dependent upon sample size and participants were able to estimate orientation variance with essentially no bias.
- Found evidence via perceptual aftereffects that intrinsic properties of complex three-dimensional objects, such as object stability (both 2D and 3D), may be encoded in early visual processing.

Hong Z. Tan's Haptic Interface Research Laboratory   **Purdue University**
Electrical Engineering Department   West Lafayette, IN
Postgraduate Research Associate   2006 to 2007

- Developed and implemented research studies to investigate the linearity of the human somatosensory system and the role of spatial and temporal Fourier components in touch perception.
- Investigated stiffness and force information transfer to provide parameters for remote telepresence.

EDUCATION

Ph.D. (2012)	Cognitive Psychology and Perceptual Science	Rutgers University
M.S. (2010)	Cognitive Psychology	Rutgers University
B.A. (2006)	Psychology and Physics	University of Virginia

SELECTED PUBLICATIONS

Refereed Journal Papers

Cholewiak, S. A., Shirley, P., McGuire, M., & Banks, M. S. (2019, in preparation). Realtime algorithm for generating color-correct depth-of- field blur. *ACM Transactions on Graphics*.

Labhishetty, V., **Cholewiak, S. A.**, & Banks, M. S. (2019, under review). Contributions of foveal and non-foveal retina to the human eye's focusing response. *Journal of Vision*.

Cholewiak, S. A., Love, G. D., & Banks, M. S. (2018). Creating correct blur and its effect on accommodation. *Journal of Vision, 18(1),* 1-29. doi: 10.1167/18.9.1

Kunsberg, B., Holtmann-Rice, D., Alexander, E., **Cholewiak, S.**, Fleming, R., & Zucker, S. W. (2018) Colour, contours, shading and shape: Flow interactions reveal anchor neighbourhoods. *Interface Focus*, 8(4). doi: 10.1098/rsfs.2018.0019

Cholewiak, S. A., Love, G. D., Srinivasan, P., & Ng, R., & Banks, M. S. (2017). ChromaBlur: Rendering chromatic eye aberration improves accommodation and realism. *ACM Transactions on Graphics (TOG)*, 36(6). doi: 10.1145/3130800.3130815

Cholewiak, S. A., Fleming, R. W., & Singh, M. (2015). Perception of physical stability and center of mass of 3-D objects. *Journal of Vision, 15(2),* 1-11. doi: 10.1167/15.2.13

Denisova, K., Kibbe, M. M., **Cholewiak, S. A.**, & Kim, S.-H. (2014). Intra- and intermanual curvature aftereffect can be obtained via tool-touch. *IEEE Transactions on Haptics*. doi: 10.1109/TOH.2013.63

Cholewiak, S. A., Fleming, R. W., & Singh, M. (2013). Visual perception of the physical stability of asymmetric three-dimensional objects. *Journal of Vision, 13(4),* 1–13. doi: 10.1167/13.4.12

Cholewiak, S.A., Kim, K., Tan, H.Z., & Adelstein, B.D. (2010). A frequency-domain analysis of haptic gratings. *IEEE Transactions on Haptics, 3*, 3-14. doi: 10.1109/TOH.2009.36

Refereed Conference Papers

Akşit, K., Lopes, W., Kim, J., Spjut, J., Patney, A., Shirley, P., Luebke, D., **Cholewiak, S. A.**, Srinivasan, P., Ng, R., Banks, M. S., & Love, G. D. (2017, July). Varifocal Virtuality: A novel optical layout for near-eye display. In SIGGRAPH '17: ACM SIGGRAPH 2017 Emerging Technologies. Los Angeles, LA. doi: 10.1145/3084822.3084829

Cholewiak, S.A., Tan, H.Z., & Ebert, D.S. (2008). Haptic identification of stiffness and force magnitude. Proceedings of the Symposium on Haptic Interfaces for Virtual Environment and Teleoperator Systems, 87-91.

Cholewiak, S., & Tan, H.Z. (2007). Frequency analysis of the detectability of virtual haptic gratings. Proceedings of the 2007 World Haptics Conference. Tsukuba, Japan: WHC, 27-32.

APPLIED EXPERIENCE

- Co-author on patent pending serial number PCT/US2017/031117 "Pseudo Light-field Display Apparatus" (https://patents.google.com/patent/WO2017192887A2).

- Strong programming skills in Python, MATLAB, and Psychtoolbox and experience in C, OpenGL, and WebGL, with a design focus on applications intended for human subjects experiments.

- Experience in Mitsuba cluster design with macOS and Debian Linux nodes for parallellized CPU ray tracing.

- Experience in Flask-based WSGI online experiment design for both broad deployment (Mechanical Turk) and local data collection using tablets (iPads).

- Online WebGL-based demonstrations of "Shape from X" phenomena (http://steven.cholewiak.com/demos/).