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Research Interests:

My research is concerned with the perceptual and cognitive processes underlying complex behavior. The basic research problems I am working on include visual space perception, visual control of locomotion, and spatial cognition, including navigation. Much of my work involves virtual environment technology, a tool that greatly expands the possibilities for experimental research. On the applied side, I have been director of a project developing a navigation system for blind people.

Information for prospective students:

I have retired from teaching and am not accepting new students but may wish to sponsor interested postdocs.

Selected Publications and Talks by Topic

(for PDFs of most recent publications, send email to loomis@psych.ucsb.edu)

Visual space perception

Nakayama, K. & Loomis, J. M. (1974) Optical velocity patterns, velocity sensitive neurons, and space perception: A hypothesis. *Perception*, 3, 63-80.

Gogel, W. C., Loomis, J. M., Newman, N. J., & Sharkey, T. J. (1985) Agreement between indirect measures of perceived distance. *Perception & Psychophysics*, 37, 17-27.

Eby, D. W. & Loomis, J. M. (1987) A study of visually directed throwing in the presence of multiple distance cues. *Perception & Psychophysics*, 41, 308-312.

Loomis, J. M., Da Silva, J.A., Fujita, N., & Fukusima, S. S. (1992) Visual space perception and visually directed action. *Journal of Experimental Psychology: Human Perception and Performance*, 18, 906-921. (1141K pdf)

Beall, A. C., Loomis, J. M., Philbeck, J. M., & Fikes, T. J. (1995) Absolute motion parallax weakly determines visual scale in real and virtual environments. *Proceedings of Conference on Human Vision, Visual Processing, and Digital Display*, 2411, pp. 288-297. Bellingham, WA: Society of Photo-Optical Instrumentation Engineers. (2,098K pdf)

Loomis, J. M., Da Silva, J. A., Philbeck, J. W., & Fukusima, S. S. (1996) Visual perception of location and distance. *Current Directions in Psychological Science*, 5, 72-77.

Philbeck, J. W. & Loomis, J. M. (1997) Comparison of two indicators of visually perceived egocentric distance under full-cue and reduced-cue conditions. *Journal of Experimental Psychology: Human Perception and Performance*, 23, 72-85. (1,252K pdf)

Fukusima, S. S., Loomis, J. M., & Da Silva, J. A. (1997) Visual perception of egocentric distance as assessed by triangulation. *Journal of Experimental Psychology: Human Perception and Performance*, 23, 86-100. (1,265K pdf)

Philbeck, J. W., Loomis, J. M., & Beall, A. C. (1997). Visually perceived location is an invariant in the control of action. *Perception & Psychophysics*, 59, 601-612. (845K pdf)

Amorim, M-A, Loomis, J. M., & Fukusima, S. S. (1998). Reproduction of object shape is more accurate without the continued availability of visual information. *Perception*, 27, 69-86. (984K pdf)

Loomis, J. M. & Philbeck, J. W. (1999). Is the anisotropy of perceived 3-D shape invariant across scale? *Perception & Psychophysics*, 61, 397-402. (448K pdf)

Loomis, J. M., Philbeck, J. W., & Zahorik, P. (2002). Dissociation of location and shape in visual space. *Journal of Experimental Psychology: Human Perception and Performance,* 28, 1202-1212. (394 K pdf)

Loomis, J. M. & Knapp, J. M. (2003). Visual perception of egocentric distance in real and virtual environments. In L. J. Hettinger and M. W. Haas (Eds.), V*irtual and Adaptive Environments* (pp. 21-46). Mahwah NJ: Erlbaum (1298K pdf)

Kelly, J. W., Loomis, J. M., & Beall, A. C. (2004). Judgments of exocentric distance in large-scale space. *Perception*, 33, 443-454. (236K pdf)

Kelly, J. W., Beall, A. C., & Loomis, J. M. (2004). Perception of shared visual space: Establishing common ground in real and virtual environments. *Presence,* 33, 433-454.

Thompson, W. B., Willemsen, P., Gooch, A. A., Creem-Regehr, Loomis, J. M., & S. H., Beall, A. C. (2004). Does the quality of the computer graphics matter when judging distances in visually immersive environments. *Presence,* 13, 560-571 (1572K pdf)

Knapp, J. M. & Loomis, J. M. (2004). Limited field of view of head-mounted displays is not the cause of distance underestimation in virtual environments. *Presence,* 13, 572-577. (972K pdf)

Hutchison, J. J. & Loomis, J. M. (2006). Does energy expenditure affect the perception of egocentric distance? A failure to replicate Experiment 1 of Proffitt, Stefanucci, Banton, and Epstein (2003). *The Spanish Journal of Psychology* , 9, 332-339. **(**434K pdf**)**

Hutchison, J. J. & Loomis, J. M. (2006). Reply to Proffitt, Stefanucci, Banton, and Epstein. *The Spanish Journal of Psychology,* 9, 343-345. (12K pdf)

Loomis, J. M. & Philbeck, J. W. (2008). Measuring perception with spatial updating and action. In R. L. Klatzky, M. Behrmann, & B. MacWhinney (Eds.), *Embodiment, ego-space, and action* (pp. 1-43). Mahwah, NJ: Erlbaum.

Visual control of locomotion and perception/action

Beall, A. C. & Loomis, J. M. (1996) Visual control of steering without course information. *Perception*, 25, 481-494. (1125K pdf)

Beall, A. C. & Loomis, J. M. (1997) Optic flow and visual analysis of the base-to-final turn. *The International Journal of Aviation Psychology*, 7, 201-223. (1242K pdf)

Loomis, J. M. & Beall, A. C. (1998). Visually-controlled locomotion: Its dependence on optic flow, 3-D space perception, and cognition. *Ecological Psychology*, 10, 271-285. (677K pdf)

Loomis, J. M. & Beall, A. C. (2004). Model-based control of perception/action. In L. Vaina, S. Beardsley, and S. Rushton (Eds.). *Optic Flow and Beyond* (pp. 421-441). Boston: Kluwer Academic Publishers. (809K pdf)

Kelly, J. W., Loomis, J. M., & Beall, A. C. (2005). The importance of perceived relative motion in the control of posture. *Experimental Brain Research*, 161, 285-292. (209K pdf)

Loomis, J. M., Beall, A. C., Kelly, J. W., & Macuga, K. L. (2005). Importance of perceptual representation in the visual control of action. *Proceedings of the IS&T/SPIE's 17th Annual Symposium on Electronics (pp. 356-361)*, January 16-20, 2005, San Jose CA.

Loomis, J. M., Beall, A. C., Macuga, K. L., Kelly, J. W. & Smith, R. S. (2006). Visual control of action without retinal optic flow. *Psychological Science*, 17, 214-221. (291K pdf)

Kelly, J. W., Beall, A. C., Loomis, J. M., Smith, R. S., & Macuga, K.L. (2006). Simultaneous measurement of steering performance and perceived heading on a curving path. *ACM Transactions on Applied Perception*, 3, 83-94. (303K pdf)

Macuga, K. L., Loomis, J. M., Beall, A. C., & Kelly, J. W. (2006). Perception of heading without retinal optic flow. *Perception & Psychophysics*, 68, 872-878. (475K pdf)

Macuga, K. L., Beall, A. C., Kelly, J. W., Smith, R. S., & Loomis, J. M. (2007). Changing lanes: Inertial information facilitates steering performance when visual feedback is removed. *Experimental Brain Research*,178, 141-150. (648K pdf)

Kelly, J. W., Riecke, B., Loomis, J. M., & Beall, A. C. (2008). Visual control of posture in real and virtual environments. *Perception & Psychophysics*, 70, 158-165.

Spatial cognition

Klatzky, R. L., Loomis, J. M., Golledge, R. G., Cicinelli, J. G., Doherty, S., & Pellegrino, J. W. (1990) Acquisition of route and survey knowledge in the absence of vision. *Journal of Motor Behavior*, 22, 19-43.

Fujita, N., Loomis, J. M., Klatzky, R. L., & Golledge, R. G. (1990) A minimal representation for dead-reckoning navigation: Updating the homing vector. *Geographical Analysis*, 22, 326-335.

Loomis, J. M., Klatzky, R. L., Golledge, R. G., Cicinelli, J. G., Pellegrino, J. W., & Fry, P. A. (1993) Nonvisual navigation by blind and sighted: Assessment of path integration ability. *Journal of Experimental Psychology: General*, 122, 73-91. (1,369K pdf)

Fujita, N., Klatzky, R. L., Loomis, J. M., & Golledge, R. G. (1993) The encoding-error model of pathway completion without vision. *Geographical Analysis*, 25, 295-314. (856K pdf)

Klatzky, R. L., Golledge, R. G., Loomis, J. M., Cicinelli, J. G., & Pellegrino, J. W. (1995) Performance of blind and sighted in spatial tasks. *Journal of Visual Impairment & Blindness*, 89, 70-82.

Golledge, R. G., Klatzky, R. L., & Loomis, J. M. (1996) Cognitive mapping and wayfinding by adults without vision. In J. Portugali (Ed.), *The construction of cognitive maps*. The Netherlands: Kluwer Associates, 1996, pp. 215-246.

Klatzky, R. L., Loomis, J. M., & Golledge, R. G. (1997). Encoding spatial representations through nonvisually guided locomotion: Tests of human path integration. In D. Medin (Ed.), *The psychology of learning and motivation*, 37, 41-84. San Diego: Academic Press.

Chance, S. S., Gaunet, F., Beall, A. C., & Loomis, J. M. (1998). Locomotion mode affects the updating of objects encountered during travel: The contribution of vestibular and proprioceptive inputs to path integration. *Presence: Teleoperators and Virtual Environments*, 7, 168-178. (212K pdf)

Klatzky, R. L., Loomis, J. M., Beall, A. C., Chance, S. S. & Golledge, R. G. (1998). Spatial updating of self-position and orientation during real, imagined, and virtual locomotion. *Psychological Science*, 9, 293-298. (233K pdf)

Loomis, J. M., Klatzky, R. L., Golledge, R. G., & Philbeck, J. W. (1999). Human navigation by path integration. In R. G. Golledge (Ed.), *Wayfinding: Cognitive mapping and other spatial processes* (pp. 125-151). Baltimore: Johns Hopkins. (1,242K pdf)

Klatzky, R. L., Beall, A. C., Loomis, J. M., Golledge, R. G., & Philbeck, J. W. (1999). Human navigation ability: Tests of the encoding-error model of path integration. *Spatial Cognition and Computation,* 1, 31-65.

Péruch, P., Gaunet, F., Thinus-Blanc, C., & Loomis, J. (2000). Understanding and learning virtual spaces. In R. Kitchin & S. Freundschuh (Eds.), *Cognitive mapping: Past, present and future* (pp. 108-124). London: Routledge.

Waller, D., Loomis, J. M., Golledge, R. G., & Beall, A. C. (2000). Place learning in humans: The role of distance and direction information. *Spatial Cognition and Computation,* 2, 333-354. (222K pdf)

Philbeck, J. W., Klatzky, R. L., Behrmann, M., Loomis, J. M., & Goodridge, J. (2001). Active control of locomotion facilitates nonvisual navigation. *Journal of Experimental Psychology: Human Perception and Performance,*27, 141-153.

Loomis, J. M., Klatzky, R. L., & Golledge, R. G. (2001). Navigating without vision: Basic and applied research. *Optometry and Vision Science*, 78, 282-289. (697K pdf)

Philbeck, J. W., Behrmann, M., & Loomis, J.M. (2001). Updating of locations during whole-body rotations in patients with hemispatial neglect. *Cognitive, Affective, and Behavioral Neuroscience,* 1, 330-343. (700 K pdf)

Loomis, J. M., Lippa, Y., Klatzky, R. L., & Golledge, R. G. (2002). Spatial updating of locations specified by 3-D sound and spatial language. *Journal of Experimental Psychology: Learning, Memory, & Cognition*, 28, 335-345. (243K pdf)

Klatzky, R. L., Loomis, J. M., & Golledge, R. G. (2002). Nonvisual navigation based on information about self-motion. In L. Backman & C. von Hofsten (Eds.), *Psychology at the turn of the millennium, Volume 1: Cognitive, biological, and health perspectives* (pp. 245-260). New York: Taylor & Francis Inc.

Mallot, H. A., Steck, S. D., & Loomis, J. M. (2002). Mechanisms of spatial cognition: Behavioral experiments in virtual environments. *Künstliche Intelligenz*, 16, 24-28 (357K pdf)

Klatzky, R. L., Lippa, Y., Loomis, J. M., & Golledge, R. G. (2002). Learning directions of objects specified by vision, spatial audition, or auditory spatial language. *Learning & Memory*, 9, 364-367.

Klatzky, R. L., Lippa, Y., Loomis, J. M., & Golledge, R. G. (2003). Encoding, learning, and spatial updating of multiple object locations specified by 3-D sound, spatial language, and vision. *Experimental Brain Research*, 149, 48-61. (274K pdf)

Waller, D., Loomis, J. M., & Steck, S. D. (2003). Inertial cues do not enhance knowledge of environmental layout. *Psychonomic Bulletin & Review*,10, 987-993. (507K pdf)

Waller, D., Loomis, J. M., & Haun D. B. M. (2004). Body-based senses enhance knowledge of directions in large-scale environments. *Psychonomic Bulletin & Review*, 11, 157-163.

Waller, D., Beall, A., & Loomis, J. M. (2004). Using virtual environments to assess directional knowledge. *Journal of Environmental Psychology*, 24, 105-116. (1024K pdf)

Avraamides, M., Klatzky, R. L., Loomis, J. M., & Golledge, R. G. (2004). Use of cognitive vs. perceptual heading during imagined locomotion depends on response mode. *Psychological Science*, 15, 403-408.

Avraamides, M., Loomis, J. M., Klatzky, R. L., & Golledge, R. G. (2004). Functional equivalence of spatial representations derived from vision and language: Evidence from allocentric judgments. *Journal of Experimental Psychology: Learning, Memory, & Cognition*, 30, 801-814.

Horn, D. L. & Loomis, J. M. (2004). Spatial updating of targets in front and behind. *Paidéia*, 14, 75-81. (433K pdf)

Loomis, J. M., Klatzky, R. L., Avraamides, M., Lippa, Y., & Golledge, R. G. (2007). Functional equivalence of spatial images produced by perception and spatial language. In F. Mast and L. Jäncke (Eds.), *Spatial processing in navigation, imagery, and perception* (pp. 29-48). New York: Springer. (2253K pdf)

Denis, M. & Loomis, J. M. (2007). Human spatial cognition: Memory, navigation, and environmental learning. *Psychological Research*, 71, 235-239.

Kelly, J. W., Avraamides, M., & Loomis, J. M. (2007). Sensorimotor alignment effects in the learning environment and in novel environments. *Journal of Experimental Psychology: Learning, Memory, & Cognition*, 33, 1092-1107. (702K pdf)

Wolbers, T., Hegarty, M., Büchel, C., & Loomis, J. M. (2008). Spatial updating: How the brain keeps track of changing object locations during observer motion. *Nature Neuroscience*, 11, 1223-1230.

Scocchia, L., Stucchi, N., & Loomis, J. M. (in press). The influence of facing direction on the haptic identification of two-dimensional raised pictures. *Perception*.

Sensory substitution and navigation system for visually impaired people

Golledge, R. G., Loomis, J. M., Klatzky, R. L., Flury, A., & Yang, X. (1991) Designing a personal guidance system to aid navigation without sight: progress on the GIS component. *International Journal of Geographic Information Systems*, 5, 373-395.

Loomis, J. M., Golledge, R. G., & Klatzky, R. L. (1993) Personal guidance system for the visually impaired using GPS, GIS, and VR technologies. *Proceedings of the Conference on Virtual Reality and Persons with Disabilities*, June 17-18, 1993, Millbrae, CA.

Loomis, J. M., Golledge, R. G., Klatzky, R. L., Speigle, J. M., & Tietz, J. (1994) Personal guidance system for the visually impaired. *Proceedings of the First Annual ACM/SIGGAPH Conference on Assistive Technologies*, Marina Del Ray, CA, October 31-November 1, 1994, pp. 85-91. New York: Association for Computing Machinery. (472K pdf)

Loomis, J. M., Golledge, R. G., & Klatzky, R. L. (1998). Navigation system for the blind: Auditory display modes and guidance. *Presence: Teleoperators and Virtual Environments*, 7, 193-203. (152K pdf)

Golledge, R. G., Klatzky, R. L., Loomis, J. M., Speigle, J., & Tietz, J. (1998). A geographical information system for a GPS based personal guidance system. *International Journal of Geographical Information Science*, 12, 727-749.

Loomis, J. M., Golledge, R. G., & Klatzky, R. L. (2001). GPS-based navigation systems for the visually impaired. In W. Barfield & T. Caudell, (Eds.), *Fundamentals of wearable computers and augmented reality* (pp. 429-446). Mahwah, NJ: Lawrence Erlbaum Associates. (890K pdf)

Loomis, J. M. (2003). Sensory replacement and sensory substitution: Overview and prospects for the future. In M. C. Roco & W. S. Bainbridge (Eds.), Converging Technologies for Improving Human Performance: Nanotechnology, Biotechnology, Information Technology and Cognitive Science. Boston: Kluwer Academic Publishers. (664K pdf)

Golledge, R. G., Marston, J. R., Loomis, J. M., & Klatzky, R. L. (2004). Stated preferences for components of a Personal Guidance System for nonvisual navigation. *Journal of Visual Impairment & Blindness*, 98, 135-147.

Loomis, J. M., Marston, J. R., Golledge, R. G., & Klatzky, R. L. (2005). Personal guidance system for people with visual impairment: A comparison of spatial displays for route guidance. *Journal of Visual Impairment & Blindness*, 99, 219-232. (801K pdf)

Marston, J. R., Loomis, J. M., Klatzky, R. L., Golledge, R. G. & Smith, E. L. (2006). Evaluation of spatial displays for navigation without sight. *ACM Transactions on Applied Perception*, 3, 110-124. (377K pdf)

Klatzky, R. L., Marston, J. R., Giudice, N. A., Golledge, R. G., & Loomis, J. M. (2006). Cognitive load of navigating without vision when guided by virtual sound versus spatial language. *Journal of Experimental Psychology: Applied*, 12, 223-232. (905K pfd)

Loomis, J. M., Golledge, R. G., Klatzky, R. L., & Marston, J. R. (2007). Assisting wayfinding in visually impaired travelers. In G. Allen (Ed.), *Applied spatial cognition: From research to cognitive technology* (pp. 179-202). Mahwah, N. J.: Lawrence Erlbaum Associates. (2675K pdf)

Marston, J. R., Loomis, J. M., Klatzky, R. L., & Golledge, R. G. (2007). Nonvisual route following with guidance from a simple haptic or auditory display. *Journal of Visual Impairment & Blindness*, 101, 203-211. (704K pdf)

Loomis, J. M. & Klatzky, R. L. (2007). Functional equivalence of spatial representations from vision, touch, and hearing: Relevance for sensory substitution. In J. J. Rieser, D. H. Ashmead, F. F. Ebner, & A. L. Corn (Eds.), *Blindness and brain plasticity in navigation and object perception* (pp. 155-184) New York: Lawrence Erlbaum Associates. (5539K pdf)

Virtual environments, social interaction, and presence

Loomis, J. M. (1992) Distal attribution and presence. *Presence: Teleoperators and Virtual Environments*, 1, 113-119. (1,107K pdf)

Loomis, J. M. (1992) Presence and distal attribution: Phenomenology, determinants, and assessment. *Proceedings of the SPIE Conference on Human Vision, Visual Processing, and Digital Display III*, 1666, 590-595.

Loomis, J. M. (1993). Understanding synthetic experience must begin with the analysis of ordinary perceptual experience. *Proceedings of IEEE Symposium on Research Frontiers in Virtual Reality*, San Jose, CA, October 25-26, 1993. (257K pdf)

Loomis, J. M., Blascovich, J.J., & Beall, A. C. (1999). Immersive virtual environment technology as a basic research tool in psychology. *Behavior Reseach Methods, Instruments, and Computers*, 31, 557-564. (722K pdf)

Durlach, N., Allen, G., Darken, R., Garnett, R.L., Loomis, J., Templeman, J., & von Wiegand, T. E. (2000). Virtual environents and the enhancement of spatial behavior: Toward a comprehensive research agenda. *Presence: Teleoperators and Virtual Environments*, 9, 593-614.

Bailenson, J. N., Blascovich, J., Beall, A. C., & Loomis, J. M. (2001). Equilibrium theory revisited: Mutual gaze and personal space in virtual environments. *Presence*, 10, 583-598.

Blascovich, J., Loomis, J., Beall, A.C,, Swinth, K. R., Hoyt, C. L., & Bailenson, J. N. (2002). Immersive virtual environment technology as a methodological tool for social psychology. *Psychological Inquiry*, 13, 103-124.

Bailenson, J. N., Blascovich, J., Beall, A. C., & Loomis, J. M. (2003). Interpersonal distance in immersive virtual environments. *Personality and Social Psychology Bulletin*, 29, 1-15.

Beall, A.C., Bailenson, J.N., Loomis, J., Blascovich, J., & Rex, C. (2003). Non-zero-sum mutual gaze in collaborative virtual environments. *Proceedings of HCI International, 2003, Crete, Greece*, 1108-1112.

Bailenson, J. N., Beall, A. C., Loomis, J., Blascovich, J. & Turk, M. (2004). Transformed social interaction: Decoupling representation from behavior and form in collaborative virtual environments. *Presence*, 13, 428-441.

Bailenson, J.N., Beall., A.C., Blascovich, J., Loomis, J., & Turk, M. (2005). Transformed

social interaction, augmented gaze, and social influence in immersive virtual environments.
Human Communication Research, 31, 511-537.

Loomis, J. M., Kelly, J. W., Pusch, M., Bailenson, J. N., & Beall, A. C. (2008). Psychophysics of perceiving eye and head direction with peripheral vision: Implications for the dynamics of eye gaze behavior. *Perception*, 37, 1443-1457.

Auditory space perception

Loomis, J.M., Hebert, C., & Cicinelli, J.G. (1990) Active localization of virtual sounds. *Journal of the Acoustical Society of America*, 88, 1757-1764.

Speigle, J. M. & Loomis, J. M. (1993) Auditory distance perception by translating observers. *Proceedings of IEEE Symposium on Research Frontiers in Virtual Reality*, San Jose, CA, October 25-26, 1993. (479K pdf)

Loomis, J. M. (1995). Some research issues in spatial hearing. *Proceedings of the IEEE Signal Processing Society 1995 Workshop on Applications of Signal Processing to Audio and Acoustics*, Mohonk, NY, Oct. 15-18, 1995.

Loomis, J. M. & Soule, J. I. (1996) Virtual acoustic displays for real and synthetic environments. *Proceedings of the Society for Information Display 1996 International Symposium*, San Diego, CA, May 12-17, 1996.

Loomis, J. M., Klatzky, R. L., Philbeck, J. W., & Golledge, R. G. (1998) Assessing auditory distance perception using perceptually directed action. *Perception & Psychophysics*, 60, 966-980. (1,098K pdf)

Loomis, J. M., Klatzky, R. L., & Golledge, R. G. (1999). Auditory distance perception in real, virtual, and mixed environments. In Y. Ohta & H. Tamura (Eds.), *Mixed reality: Merging real and virtual worlds* (pp. 201-214). Tokyo: Ohmsha. (646K pdf)

Motion perception and structure-from-motion

Loomis, J. M. & Nakayama, K. (1973) A velocity analogue of brightness contrast. *Perception*, 2, 425-428.

Loomis, J. M. & Eby, D. W. (1988) Perceiving structure from motion: Failure of shape constancy. *Proceedings of Second International Conference on*

Computer Vision. Washington, D.C.: Computer Society of the IEEE, pp. 383-391. (536K pdf)

Loomis, J. M. & Eby, D. W. (1989) Relative motion parallax and the perception of structure from motion. *Proceedings of the Workshop on Visual Motion*. Washington, D.C.: Computer Society of the IEEE, pp. 204-211.

Eby, D. W., Loomis, J. M., & Solomon, E. M. (1989) Perceptual linkage of multiple objects rotating in depth. *Perception*, 18, 427-444.

Eby, D. W. & Loomis, J. M. (1993). The minimal effect of occlusion on perceived depth from motion parallax. *Bulletin of the Psychonomic Society*, 31, 253-256.

Color vision

Loomis, J. M. (1972) The photopigment bleaching hypothesis of complementary afterimages: A psychophysical test. *Vision Research*, 12, 1587-1594. (427K pdf)

Loomis, J. M. (1978) Complementary afterimages and the unequal adapting effects of steady and flickering light. *Journal of the Optical Society of America*, 68, 411-416.

Loomis, J. M. & Berger, T. (1979) Effects of chromatic adaptation on color discrimination and color appearance. *Vision Research*, 19, 891-901. (667K pdf)

Loomis, J. M. (1980) Transient tritanopia: Failure of time-intensity reciprocity with adaptation to longwave light. *Vision Research*, 20, 837-846.

Touch and vision: hyperacuity, character recognition, object recognition

Talk:

Loomis, J. M. & Lederman, S. J. (1984). What utility is there in distinguishing between active and passive touch. Talk presented at the anuual meeting of the Psychonomic Society, San Antonio Texas, November 1984. (298K pdf).

Publications:

Loomis, J. M. (1974) Tactile letter recognition under different modes of stimulus presentation. *Perception and Psychophysics*, 16, 401-408. (511K pdf)

Apkarian-Stielau, P. & Loomis, J. M. (1975) A comparison of tactile and blurred visual form perception. *Perception & Psychophysics*, 18, 362-368. (279K pdf)

Loomis, J. M. & Apkarian-Stielau, P. (1976) A lateral masking effect in tactile and blurred visual letter recognition. *Perception & Psychophysics*, 20, 221-226.

Loomis, J. M. (1978) Lateral masking in foveal and eccentric vision. *Vision Research*, 18, 335-338.

Loomis, J. M. & Collins, C. C. (1978) Sensitivity to shifts of a point stimulus: An instance of tactile hyperacuity. *Perception & Psychophysics*, 24, 487-492.

Loomis, J. M. (1979) An investigation of tactile hyperacuity. *Sensory Processes*, 1979, 3, 289-302. (685K pdf)

Loomis, J. M. (1980) Interaction of display mode and character size in vibrotactile letter recognition. *Bulletin of the Psychonomic Society*, 16, 385-387.

Loomis, J. M. (1981) On the tangibility of letters and braille. *Perception & Psychophysics*, 29, 37-46. (751K pdf)

Loomis, J. M. (1981) Tactile pattern perception. *Perception*, 10, 5-27. (1,524K pdf)

Loomis, J. M. (1982) Analysis of tactile and visual confusion matrices. *Perception & Psychophysics*, 31, 41-52. (931K pdf)

Lederman, S. J., Loomis, J. M., & Williams, D. A. (1982) The role of vibration in the tactual perception of roughness. *Perception & Psychophysics*, 32, 109-116.

Loomis, J. M. (1985) Tactile recognition of raised characters: A parametric study. *Bulletin of the Psychonomic Society*, 23, 18-20.

Loomis, J. M. & Lederman, S. J. (1986) Tactual perception. In Boff, K., Kaufman, L., & Thomas, J. (Eds.), *Handbook of Perception and Human Performance*, Volume II, Chapt. 31. (3,556K pdf)

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