

PHILIP J. KELLMAN

Curriculum Vitae

University of California, Los Angeles
Department of Psychology
405 Hilgard Avenue
Los Angeles, CA 90095-1563
(310) 454-8115

October, 2020

Kellman@cognet.ucla.edu
<http://kellmanlab.psych.ucla.edu/>

EDUCATION

Ph.D., University of Pennsylvania, Experimental Psychology, 1980
M.A., University of Pennsylvania, Experimental Psychology, 1977
B.S., *magna cum laude*, Psychology, Georgetown University, 1976

POSITIONS

Chair, Cognitive Area, UCLA Department of Psychology, 2001-02; 2007-09; 2011 – present
Chair, Area Chairs Committee, UCLA Department of Psychology, 2015-16; 2017-present
Distinguished Professor of Psychology, University of California, Los Angeles, 2015 - present
Adjunct Professor of Surgery, UCLA David Geffen School of Medicine, 2014 - present
Professor of Psychology, University of California, Los Angeles, 1993 – 2014
Director, UCLA Cognitive Science Research Program, 1993 – 2003
Director, UCLA Psychology Department Honors Program, 1994 -96
Professor of Psychology, Swarthmore College, 1992-93; Associate Professor, 1986-92; Assistant Professor, 1980-1986
Chair, Division of Natural Sciences and Engineering, Swarthmore College, 1989-91
National Research Council Senior Associate, Aerospace Human Factors Division, NASA Ames Research Center, 1991-92
Adjunct Professor of Psychology, University of Pennsylvania, 1988-93
Fulbright Senior Scholar, The University of New South Wales, Sydney, Australia, 1987-1988
Visiting Scientist, Psykologiska Institutionen, Uppsala Universitet, Uppsala, Sweden, 1984

SELECTED HONORS AND AWARDS

Fellow, Society of Experimental Psychologists
Fellow, Association for Psychological Science
Fellow, The Psychonomic Society
Distinguished Teaching Award, UCLA Department of Psychology, 2008
Irvin Rock Memorial Lecturer, University of California, Berkeley, 2004
Supervisor: James McKeen Cattell Dissertation Award, New York Academy of Sciences, 2004
(National award given annually for "best dissertation in Psychology" awarded to Evan M. Palmer for *Spatiotemporal reliability in the perception of dynamically occluded objects*)
Wolf Aviation Prize, Alfred and Constance Wolf Foundation, 1993

(National award given annually by the for "best new idea benefitting aviation"); awarded for the idea of aviation perceptual learning modules (PLMs)

National Research Council Senior Associateship, 1991-92

Fulbright Senior Scholar, 1987-88

James McKeen Cattell Award, 1988

William Chase Memorial Award, Carnegie-Mellon University, 1987

(National award given biennially for outstanding early career contributions to cognitive science)

Boyd R. McCandless Young Scientist Award, American Psychological Association, 1986

(National award given annually for early career contributions in developmental psychology)

SELECTED INVITED LECTURES

Invited Speaker, Gordon Conference on Scientific Visualization, Lewiston, ME, August, 2017

Invited Speaker, AVEX Aviation Safety Symposium, March, 2017, 2019

Featured Scholar, Wisconsin Ideas in Education Series (WIES), University of Wisconsin-Madison, Center for Education Research, November, 2015.

Grand Rounds, UCLA David Geffen School of Medicine, Department of Surgery, July, 2015

Invited Symposium Speaker, Symposium on *Human Mathematical Abilities: From Intuition to the Classroom and Back*, 2015 AAAS Meeting

Keynote speaker, 9th Annual Meeting of the Configural Processing Consortium, Long Beach, CA, 2014

Keynote speaker, UCLA Department of Ophthalmology Annual Retreat, Big Bear, CA, 2013

Invited Discussant, Conference on Findings of the National R&D Center for Cognition and Science Instruction, US Dept. of Education, May, 2013.

Keynote speaker, Delaware State Teacher of the Year Awards Ceremony, University of Delaware, April, 2012

Keynote speaker, *Los Angeles Symposium on Educational Reform*, sponsored by New Roads School System, October, 2010; February 2012

Invited Discussant, US Dept. of Education, Institute for Education Sciences, IES R&D Centers Meeting, *Improving Mathematics and Science Outcomes*, 2011

Keynote speaker, *Second Annual Symposium on the Science of Learning in Medical Education*, UCLA David Geffen School of Medicine, October, 2010

Keynote speaker, *Association for Advancement of Artificial Intelligence (AAAI) Symposium on Cognitive Shape Processing*, Stanford University, March, 2010

Invited speaker, *European Conference on Computer Visions (ECCV)*, Symposium on human and computer shape processing, Heraklion, Crete, September, 2010.

RESEARCH GRANTS

Current:

National Institutes of Health / National Cancer Institute (2019 - 2023), "Perceptual and Adaptive Learning in Cancer Image Interpretation." Role: PI

National Science Foundation (2017-2020), "Advancing theory and application in perceptual and adaptive learning to improve community college mathematics." Role: PI.

Selected Earlier Grants and Contracts (since 2005):

US Dept. of Education, Institute for Education Sciences, *Cognition and Student Learning Program* (2012-2017), "Perceptual and adaptive learning technology in mathematics: Efficacy and Replication" PI: P. Kellman; Co-PI: C. Massey (University of Pennsylvania).

AAA Foundation for Traffic Safety (AAAFTS), "Development of a novice driver training module to accelerate driver perceptual expertise through perceptual and adaptive learning," Role: Co-PI; PI: N. Lerner, Westat Corp.

US Office of Naval Research (2013-2016), "Combining perceptual and adaptive learning with simulation for training combat medics in hemorrhage control," Role: Co-PI; PI: E. Dutson.

National Science Foundation (NSF) REESE Program (2011-2015), "Adaptive sequencing and perceptual learning technologies in mathematics and science," Role: PI; Co-PI: Christine Massey, University of Pennsylvania.

National Institute of Justice (2010-2014), "Error rates for latent fingerprinting as a function of visual complexity and cognitive difficulty," Role: Co-PI; PI: J. Mnookin.

Institute for Innovative Technology in Medical Education, "iPAL-GAME (Interactive Perceptual and Adaptive Learning Game-Aided Medical Education): Development and pilot," Role: Co-PI; PI: Sara Kim, 2011-2012; Sally Krasne, 2012.

UCLA Medical School, Center for Advanced Surgical and Interventional Technology (CASIT), (2009-2013), "Perceptual and adaptive learning technology in medical training," Role: PI

US Dept. of Education, Institute for Education Sciences, Cognition and Student Learning Program R305H060070 (2006-2010), "Integrating conceptual foundations in mathematics through the application of principles of perceptual learning" Role: PI; Co-PI: C. Massey (University of Pennsylvania).

National Institutes of Health (NIH) ARRA Challenge Grant (2009-2012), "Perceptual and adaptive learning in chemistry education," Role: PI; Co-PI: Arlene Russell, UCLA.

US Army RDECOM (2009-2011), "Adaptive computer-assisted (ACAT) technology for optimal sick call performance," Co-PI; PI: C. Hein.

NSF Research on Learning and Education (ROLE) Program 0231826 (2003 – 2006): "Perceptual Learning in Mathematics and Science: Structure Discovery, Fluency and Integration." PIs: P. Kellman and C. Massey (University of Pennsylvania).

National Eye Institute (NEI) EY13518 (2001-2005), "Spatial and temporal integration in visual object perception," PI: P. Kellman; Co-PI: Thomas F. Shipley (Temple University).

PROFESSIONAL AFFILIATIONS

Association for Psychological Science (APS)
Society of Experimental Psychologists
Human Factors and Ergonomics Society (HFES)
Vision Sciences Society (VSS)
The Psychonomic Society
Cognitive Science Society
Configural Processing Consortium (CPC)

Association for Research in Vision and Ophthalmology (ARVO)
Aerospace Medical Association
Aircraft Owners and Pilots Association (AOPA)
Society for Research in Child Development (SRCD)

SELECTED OTHER PROFESSIONAL ACTIVITIES

Consultant, “Evaluation of training programs to accelerate hazard anticipation skills in novice teen drivers,” AAA Foundation for Traffic Safety research grant to the National Advanced Driving Simulator, University of Iowa, 2018-19

Chair, Configural Processing Consortium, 2019 -

White House Conference on Bridging Neuroscience and Learning, White House Office of Science and Technology Policy (OSTP), February 2015

Consultant to White House Office of Science and Technology Policy (OSTP) on pull mechanisms in advancing learning technology in STEM education, 2016

Board of Directors, Center for Effective Learning (C4EL), New Roads High School, Santa Monica, CA, 2008-13

Invited Discussant, US Dept. of Education, Institute for Education Sciences, IES R&D Center Meeting, *Improving Mathematics and Science Outcomes for Middle School Learners*, 2011

Review Board, Vision Sciences Society, 2000 – 2016

Member, Parents Council, Washington University in St. Louis, 2009-2013

Mentor, Honors Science Mentorship Program, Marlborough School, Los Angeles, CA

Chair, 2014 and 2007 Configural Processing Consortium (CPC) Annual Meeting

Founder, Insight Learning Technology, Inc.

Committee of Visitors to review the Cognitive and Behavioral Sciences Division and the Human Cognition & Perception Program, National Science Foundation, 1999

Member, Panel on *Cognitive Resources for Force-after-Next*, US Dept. of Defense, 1999

Human factors consultant to CA Attorney General, Exponent Failure Analysis Associates, Inc., Hughes Research Laboratories, Electric Power Research Institute, Merck, Inc., Embry-Riddle Aeronautical University, Federal Aviation Administration; expert witness in numerous legal cases.

Associate Editor, *Perception & Psychophysics*, 1993-1998

Panel Member, National Science Foundation Graduate Fellowship Program, 1990-92; 1994-95; 2007

UCLA Psychology Department positions: Chair, Area Chairs Committee, 2015-16; 2017-present; Chair, Cognitive Area, 2001 – 2002, 2007-2009; 2011-present; TA/Fellowship Committee, 2020; Executive Committee, 1996-1998; 2006 – 2008; Merit Review Committee, 2005 – 2008; Chair, Space Committee, 2000 -2001; Chair, Cognitive Science Major Committee, 1999-2002; Chair, Information Services Committee, 1996-1999

External Evaluation Committee, Department of Psychology, Gettysburg College, 2000; Department of Psychology, Franklin & Marshall College, 1991

National Science Foundation Advisory Panel, Human Cognition and Perception Program, Division of Behavioral and Neural Sciences, 1987-1990

Swarthmore College positions: Chair, Division of Natural Sciences and Engineering, 1989-91;
Chair, Computing Services Committee, 1988-89; Chair, Linguistics Search Committee,
1986-87; Sigma Xi Chapter President, 1986-87
Consultant on NICHD Grant #PHS/HCFA 88-1, "Residential Swimming Pool Protective
Systems" to COMSIS Corporation, 1988
Consultant on US Consumer Product Safety Commission Contract #CPSC-P-87-1143,
"Evaluation of Swimming Pool Protective Devices" to COMSIS Corporation, 1987
Consulting Editor, *Developmental Psychology*, 1986-92
Grant reviewer for NASA, NSF, NIH, NEI, NIMH, Australian National Research Council
Reviewer for numerous journals, including: *Science*, *Psychological Review*, *Journal of Vision*, *Journal of
Experimental Psychology: General*, *Current Directions in Psychological Science*, *Journal of Experimental
Psychology: Human Perception & Performance*, *Vision Research*, *Journal of Vision*, *Journal of the Optical
Society of America A*, *Perception*, *Proceedings of the National Academy of Sciences*, *Attention*, *Perception
& Psychophysics*, *Psychological Science*, *Spatial Vision*, *Current Directions in Psychological Science*,
Journal of Experimental Child Psychology, *Child Development*, *Cognitive Development*, *Developmental
Psychology*, *Infant Behavior and Development*, *Cognition*, *Cognitive Psychology*, *Cognitive Science*,
Contemporary Psychology, *Contemporary Psychological Research and Reviews*, *Pragmatics and Cognition*

SELECTED PRESS / MEDIA / GOVERNMENT COVERAGE

ScienceDaily:

<https://www.sciencedaily.com/releases/2019/01/190107131236.htm>

EurekaAlert (American Association for the Advancement of Science):

https://www.eurekaalert.org/pub_releases/2019-01/uoc--cai010719.php

The Hans India:

<https://www.thehansindia.com/posts/index/Young-Hans/2019-01-09/Long-way-before-AI-systems-take-over-humans-jobs/471870>

Phys.org:

<https://phys.org/news/2019-01-artificial-intelligence-polar.html>

UCLA Newsroom:

<http://newsroom.ucla.edu/releases/can-artificial-intelligence-tell-a-polar-bear-from-a-can-opener>

University of California Home Page:

<https://www.universityofcalifornia.edu/news/can-artificial-intelligence-tell-polar-bear-can-opener>

The Economic Times:

<https://economictimes.indiatimes.com/jobs/long-way-before-ai-systems-take-over-humans-jobs-study/articleshow/67434071.cms>

British Journal of Anaesthesia, 9/2016, "New approaches to the development of expertise in
Anaesthesia," <https://academic.oup.com/bja/article/117/5/545/2424604>

New York Times, 3/2015:

http://www.nytimes.com/2015/03/29/sunday-review/learning-to-see-data.html?_r=0

UCLA Newsroom:

<http://newsroom.ucla.edu/dept/faculty/psychologist-philip-kellman-serves-as-expert-in-white-house-workshop>

UCLA Department of Psychology:

<https://www.psych.ucla.edu/news/highlighting-faculty-member-philip-kellman>

US Dept. of ED, Institute of Education Science, 2012 *Director's Report to Congress*

<http://ies.ed.gov/pdf/20126002.pdf>

New York Times, 6/2011:

<http://www.nytimes.com/2011/06/07/health/07learn.html?pagewanted=all&r=0>

CBS News: <http://www.cbsnews.com/video/watch/?id=7370719n&tag=mncol;lst;1>

New Scientist: <http://www.newscientist.com/article/mg21328482.100-learning-without-remembering-brain-lab-goes-to-school.html>

E-school News: <http://www.eschoolnews.com/2012/07/24/new-math-software-targets-perceptual-learning/>

National Center for Educational Research (NCER):

<http://ies.ed.gov/ncer/whatsnew/highlights.asp?Date=6/1/2011>

Cable TV Series "Auto Addiction":

Featured in first episode "Distracted Driving": <http://erthbound.com/project/auto-addiction/>

PUBLICATIONS

Books

Arterberry, M.E. & Kellman, P.J. (2016). *Development of Perception in Infancy: The Cradle of Knowledge Revisited*, Oxford University Press.

Shipley, T.F. & Kellman, P. J. (Eds.). (2001). *From Fragments to Objects: Segmentation and Grouping in Vision*. Amsterdam: Elsevier Science Press. ISBN 0-444-50506-7.

Kellman, P.J. & Arterberry, M. (1998). *The Cradle of Knowledge: Perceptual Development in Infancy*. Cambridge, MA: MIT Press. ISBN 0-262-11232-9.

Articles and Manuscripts

Baker, N., Garrigan, P. & Kellman, P. J. (press). Constant curvature segments as building blocks of 2D shape representation. *Journal of Experimental Psychology: General*.

Baker, N., Lu, H., Erlikhman, G., & Kellman, P. J. (2020). Local features and global shape information in object classification by deep convolutional neural networks. *Vision Research*, 172, 46-61.

Mettler, E., Massey, C., Burke, T.B., & Kellman, P. J. (2020). Comparing adaptive and random spacing schedules during learning to mastery criteria. *Proceedings of the 42st Annual Conference of the Cognitive Science Society* (pp.). Toronto, ON: Cognitive Science Society.

Mettler, E., Massey, C., El-Ashmawy, A.K., & Kellman, P. J. (2020). Adaptive vs. fixed spacing of learning items: Evidence from studies of learning and transfer in chemistry education. *Proceedings of the 42st Annual Conference of the Cognitive Science Society* (pp.). Toronto, ON: Cognitive Science Society.

Krasne, S., Stevens, C. D., Kellman, P. J., & Niemann, J. T. (2020). Mastering ECG interpretation skills through a perceptual and adaptive learning module. *Academic Emergency Medicine Education & Teaching*.

Mettler, E., Phillips, A., Massey, C., Burke, T., Garrigan, P., & Kellman, P. J. (2019). The synergy of passive and active learning modes in adaptive perceptual learning. In A.K. Goel, C.M. Seifert, & C. Freksa

- (Eds.), *Proceedings of the 41st Annual Conference of the Cognitive Science Society* (pp. 2351-2357). Montreal, QB: Cognitive Science Society.
- Baker, N., Lu, H., Erlikhman, G. & Kellman, P.J. (2018). Deep convolutional networks do not classify based on global object shape. *PLOS: Computational Biology*, <https://doi.org/10.1371/journal.pcbi.1006613>
- Krasne, S. & Kellman, P.J. (2018). Accelerating expertise: Perceptual and adaptive learning technology in medical learning. *Medical Teacher*, Special issue on adaptive learning in medical education, 40:8, 797-802, DOI: [10.1080/0142159X.2018.1484897](https://doi.org/10.1080/0142159X.2018.1484897).
- Baker, N., Kellman, P.J., Erlikhman, G. & Lu, H. (2018). Deep convolutional networks do not perceive illusory contours. In T.T. Rogers, M. Rau, X. Zhu, & C. W. Kalish (Eds.), *Proceedings of the 40th Annual Conference of the Cognitive Science Society* (pp.). Austin, TX: Cognitive Science Society
- Mettler, E., Massey, C.M., Garrigan, P. & Kellman, P.J. (2018). Enhancing adaptive learning through strategic scheduling of passive and active learning modes. In T.T. Rogers, M. Rau, X. Zhu, & C. W. Kalish (Eds.), *Proceedings of the 40th Annual Conference of the Cognitive Science Society* (pp.). Austin, TX: Cognitive Science Society.
- Cui, L., Massey, C.M. & Kellman, P.J. (2018). Perceptual learning in correlation estimation: The role of learning category organization. In T.T. Rogers, M. Rau, X. Zhu, & C. W. Kalish (Eds.), *Proceedings of the 40th Annual Conference of the Cognitive Science Society* (pp.). Austin, TX: Cognitive Science Society.
- Baker, N. & Kellman, P.J. (2018). Abstract shape representation in human visual perception. *Journal of Experimental Psychology: General*. doi: 10.1037/xge0000409. [Epub ahead of print]
- Palmer, E.M. & Kellman, P.J. (2017). The aperture capture illusion. In Shapiro, A., & Todorovic, D. (Eds.) *The Oxford Compendium of Visual Illusions*. Oxford University Press.
- Lerner, N., Gill, M., Scott-Parker, B. & Kellman, P.J. (2017). Accelerating driver expertise through perceptual and adaptive learning. Report to the AAA Foundation for Traffic Safety, Westat Corp. (Available on National Academy of Sciences website at: <https://trid.trb.org/view.aspx?id=1461088>.)
- Romito, B., Krasne, S., Kellman, P. & Dhillon, A. (2016). The impact of a perceptual and adaptive learning module on transoesophageal echocardiography interpretation by anaesthesiology residents. *British Journal of Anaesthesia*, 117 (4): 477-481.
- Massey, C.M., Kregor, J.D. & Kellman, P.J. (2016). Implementing mathematics learning software successfully in urban schools: Lessons for research and practice. American Educational Research Association (AERA) Online Paper Repository. <http://www.era.net/Publications/Online-Paper-Repository/AERA-Online-Paper-Repository/Owner/444889>
- Bufford, C.A., Thai, K.P., Ho, J., Xiong, C., Hines, C. & Kellman, P.J. (2016). Perceptual learning of abstract musical patterns: Recognizing composer style. *Proceedings of the 14th International Conference on Music Perception and Cognition*.
- Carrigan, S.B., Palmer, E.M. & Kellman, P.J. (2016). Differentiating global and local contour completion using a dot localization paradigm, *Journal of Experimental Psychology: Human Perception and Performance*. 2016 Aug 8. [Epub ahead of print]
- Erlikhman, G. & Kellman, P.J. (2016). From flashes to edges to objects: Recovery of local edge fragments initiates spatiotemporal boundary formation. *Frontiers in Psychology, Special issue on Perceptual Grouping—the State of the Art*. 28 June 2016 | <http://dx.doi.org/10.3389/fpsyg.2016.00910>
- Mettler, E.M., Massey, C.M. & Kellman, P.J. (2016). A comparison of adaptive and fixed schedules of practice. *Journal of Experimental Psychology: General*, 145(7): 897-917.

- Unuma, H., Hasegawa, H., & Kellman, P.J. (2016). Perceptual learning facilitates precise mental representations of fractions. *The Journal of Kawamura Gakuen Women's University*, 27(1), 35-49.
- Erlikhman, G. & Kellman, P.J. (2015). Modeling spatiotemporal boundary formation. *Vision Research*, Special issue on Quantitative Approaches in Gestalt perception. pii: S0042-6989(15)00118-2. doi: 10.1016/j.visres.2015.03.016.
- Thai, K.P., Krasne, S. & Kellman, P.J. (2015). Adaptive perceptual learning in electrocardiography: The synergy of passive and active classification. In Noelle, D. C., Dale, R., Warlaumont, A. S., Yoshimi, J., Matlock, T., Jennings, C. D., & Maglio, P. P. (Eds.) *Proceedings of the 37th Annual Meeting of the Cognitive Science Society*. Austin, TX: Cognitive Science Society, 2350-2355.
- Alibali, M., Kalish, C., Rogers, T.T., Sloutsky, V., Massey, C.M., Kellman, P.J., McClelland, J.L., & Mickey, K.W. (2015). Connecting learning, memory, and representation in math education. In Noelle, D. C., Dale, R., Warlaumont, A. S., Yoshimi, J., Matlock, T., Jennings, C. D., & Maglio, P. P. (Eds.) *Proceedings of the 37th Annual Meeting of the Cognitive Science Society*. Austin, TX: Cognitive Science Society, 19-20.
- Rimoin, L., Altieri, L., Craft, N., Krasne, S. & Kellman, P. (2015). Training pattern recognition of skin lesion morphology, configuration and distribution. *Journal of the American Academy of Dermatology*, 72(3):489-95. doi: 10.1016/j.jaad.2014.11.016. Epub 2015 Jan 13.
- Erlikhman, G., Xing, Y.Z. & Kellman, P.J. (2014). Non-rigid illusory contours and global shape transformations defined by spatiotemporal boundary formation. *Frontiers in Human Neuroscience*, <http://dx.doi.org/10.3389/fnhum.2014.00978>
- Ghose, T., Liu, J. & Kellman, P.J. (2014) Recovering metric properties of objects through spatiotemporal interpolation. *Vision Research*. DOI: 10.1016/j.visres.2014.07.015, published online 8 August 2014.
- Bufford, C.A., Mettler, E., Geller, E.H. & Kellman, P.J. (2014). The psychophysics of algebra expertise: Mathematics perceptual learning interventions produce durable encoding changes. In P. Bello, M. Guarini, M. McShane & B. Scassellati, (Eds.), *Proceedings of the 36th Annual Conference of the Cognitive Science Society*. Austin, TX: Cognitive Science Society.
- Kellman, P.J., Mnookin, J., Erlikhman, G., Garrigan, P., Ghose, T., Mettler, E., Charlton, D. & Dror, I.E. (2014). Forensic comparison and matching of fingerprints: Using quantitative image measures for estimating error rates through understanding and predicting difficulty. *PLoS ONE*, 9(5): e94617.
- Palmer, E. & Kellman, P.J. (2014). The aperture capture illusion: Misperceived forms in dynamic occlusion displays. *Journal of Experimental Psychology: Human Perception and Performance*, 40(2), 502-24.
- Mettler, E.M. & Kellman, P.J. (2014). Adaptive response-time-based sequencing in perceptual learning. *Vision Research*, 99: 111-123.
- Krasne, S., Hillman, J.D., Kellman, P.J. & Drake, T.A. (2013). Applying perceptual and adaptive learning techniques to introductory histopathology for medical students. *Journal of Pathology Informatics*, 4: 34-41.
- Kellman, P. J. (2013). Adaptive and perceptual learning technologies in medical education and training. *Military Medicine*, 178, 10: 98-106.
- Erlikhman, G., Keane, B.P., Mettler, E., Horowitz, T.S., & Kellman, P.J. (2013). Automatic feature-based grouping during multiple object tracking. *Journal of Experimental Psychology: Human Perception and Performance*, 39(6), 1625-37.
- Keane, B.P., Lu, H., Papathomas, T.V., Silverstein, S.M., & Kellman, P.J. (2013). Reinterpreting behavioral receptive fields: Surface filling-in alters visually completed shape. *PLoS ONE*, 8(6),

e62505.

- Keane, B.P., Kellman, P.J., Lu, H., & Papathomas, T.V., & Silverstein, S.M. (2012). Is interpolation cognitively encapsulated? Measuring the effects of belief on Kanizsa shape discrimination and illusory contour formation. *Cognition*, 123, 404–418.
- Garrigan, P.B. & Kellman, P.J. (2011). The role of constant curvature in 2D contour shape representations. *Perception*, 40(11): 1290-1308.
- Wise, J. & Kellman, P.J. (2011). Changing the face of learning: Perceptual learning, the path to expert pattern recognition. *California Association of Independent Schools (CAIS) Faculty Newsletter*, Fall, 2011, pp. 4-6.
- Mettler, E., Massey, C. & Kellman, P. (2011). Improving adaptive learning technology through the use of response times. In L. Carlson, C. Holscher, & T. Shipley (Eds.), *Proceedings of the 33rd Annual Conference of the Cognitive Science Society*. Boston, MA: Cognitive Science Society, 2532-2537.
- Thai, K.P. & Kellman, P. (2011). Basic information processing effects from perceptual learning in complex, real-world domains. In L. Carlson, C. Holscher, & T. Shipley (Eds.), *Proceedings of the 33rd Annual Conference of the Cognitive Science Society*. Boston, MA: Cognitive Science Society.
- Keane, B. P., Mettler, E.; Tsoi, V., Kellman, P. J. (2011). Attentional signatures of perception: Multiple object tracking reveals the automaticity of contour interpolation. *Journal of Experimental Psychology: Human Perception and Performance*, 37(3), 685-698.
- Kalar, D., Garrigan, P., Hilger, J., Wickens, T. & Kellman, P. (2010). A unified model for contour interpolation. *Vision Research*, 50(3), 284-299.
- Kellman, P.J., Massey, C.M & Son, J. (2010). Perceptual learning modules in mathematics: Enhancing students' pattern recognition, structure extraction, and fluency. *Topics in Cognitive Science* (Special Issue on Perceptual Learning), Vol. 2, Issue 2, 285-305.
- Unuma, H., Hasegawa, H., & Kellman, P. J. (2010). Spatiotemporal integration and contour interpolation revealed by a dot localization task with serial presentation paradigm. *Japanese Psychological Research*, 52(4), 268-280.
- Ghose, T., Liu, J. & Kellman, P.J. (2010). Measuring size of a never present object: Visual object formation through spatio-temporal interpolation. In A. A. Bastianelli, G. Vidotto (Eds.), *Fechner Day 2010. Proceedings of the International Society for Psychophysics*, 2010, 208-212.
- Unuma, H., Kellman, P.J., & Hasegawa, H. (2010). Consideration of geometric and neurophysiological models in visual interpolation. *The Journal of Kawamura Gakuen Women's University*, Vol.16.
- Kellman, P.J. & Garrigan, P.B. (2009). Perceptual learning and human expertise. *Physics of Life Reviews*, Vol. 6, No. 2, 53-84.
- Palmer, E.M., Brown, C.M., Bates, C.F., Kellman, P.J. & Clausner, T.C. (2009). Perceptual cues and imagined viewpoints modulate visual search in air traffic control displays, *Proceedings of the Human Factors and Ergonomics Society*, Vol. 53, No. 17, 1111-1115.
- Garrigan, P.B. & Kellman, P.J. (2008). Perceptual learning depends on perceptual constancy. *Proceedings of the National Academy of Sciences (USA)*, Vol. 105, No. 6, 2248-2253.
- Fantoni, C., Hilger, J., Gerbino, W. & Kellman, P. J. (2008). Surface interpolation and 3D relatability. *Journal of Vision*, Vol. 8, No. 7, Article 29, 1-19.
- Fantoni, C., Gerbino, W. & Kellman, P.J. (2008). Approximation, torsion, and amodally completed surfaces. *Vision Research*, 48(10): 1196-1216.

- Unuma, H., Hasegawa, H. & Kellman, P.J. (2008). The role of the visual buffer in visual interpolation. *The Journal of Kawamura Gakuen Woman's University*, Vol. 19, No. 1, 55-70.
- Kellman, P.J., Massey, C.M., Roth, Z., Burke, T., Zucker, J., Saw, A., Aguero, K.E. & Wise, J.A. (2008). Perceptual learning and the technology of expertise: Studies in fraction learning and algebra. *Learning Technologies and Cognition: Special issue of Pragmatics & Cognition*, 16:2 (2008), 356–405.
- Palmer, E.M., Clausner, T. C. & Kellman, P.J. (2008). Enhancing air traffic displays via perceptual cues. *ACM Transactions on Applied Perception (TAP)*, Vol. 5(1), 1-22.
- Keane, B. P., Lu, H., & Kellman, P. J. (2007). Classification images reveal spatiotemporal interpolation in illusory figures. *Vision Research*, 47, 3460-3475.
- Kellman, P.J., Garrigan, P.B., Shipley, T.F. & Keane, B.P. (2007). Postscript: Identity and constraints in models of object formation. *Psychological Review*, 114(2): 502-508.
- Kellman, P.J., Garrigan, P.B., Shipley, T.F. & Keane, B.P. (2007). Interpolation processes in object perception: A reply to Anderson. *Psychological Review*, 114(2): 488-502.
- Palmer, E. M., Kellman, P. J., & Shipley, T. F. (2006). A theory of dynamic occluded and illusory object perception. *Journal of Experimental Psychology: General*, 135, 513–541. (Selected for American Psychological Association *Young Investigator Award* – best paper published in *JEP: General* in 2006 by a young investigator (Evan Palmer).)
- Kellman, P.J., Garrigan, P., & Shipley, T. F. (2005). Object interpolation in three dimensions. *Psychological Review*, Vol. 112, No. 3, 586-609.
- Kellman, P.J., Garrigan, P., Yin, C., Shipley, T. & Machado, L. (2005). 3D interpolation in object perception: Evidence from an objective performance paradigm. *Journal of Experimental Psychology: Human Perception & Performance*, 31, 558-583.
- Guttman, S.E. & Kellman, P.J. (2004). Contour interpolation revealed by a dot localization paradigm. *Vision Research*, 44(15), 1799-1815.
- Guttman, S.E., Sekuler, A.B. & Kellman, P.J. (2003). Temporal variations in visual completion: A reflection of spatial limits? *Journal of Experimental Psychology: Human Perception and Performance*, 29, 1211-1227.
- Kellman, P.J. (2003). Perceptual processes that create objects from fragments. *Proceedings of the 2003 IEEE International Joint Conference on Neural Networks*.
- Shipley, T.F. & Kellman, P.J. (2003). Boundary completion in illusory contours: Interpolation or extrapolation? *Perception*, 32(8):985-999.
- Kellman, P.J. (2003). Interpolation processes in the visual perception of objects. *Neural Networks*, 16, 915-923.
- Kellman, P.J. (2002). Vision - occlusion, illusory contours and 'filling in. In *Encyclopedia of Cognitive Science*, Oxford, UK: Nature Publishing Group.
- Kellman, P.J. (2001). Separating processes in object perception. *Journal of Experimental Child Psychology*, 78, 84-97.
- Yin, C., Kellman, P.J. & Shipley, T.F. (2000). Surface integration influences depth discrimination. *Vision Research*, 40(15), 1969-1978.
- Kellman, P.J. & Arterberry, M.A. (2000). Learning and developing from innate foundations: Invited commentary on A. Slater's review of *The Cradle of Knowledge*. *British Journal of Educational Psychology*.

- Wise, J.A., Kubose, T., Chang, N., Russell, A. and Kellman, P.J. (2000). Perceptual learning modules in mathematics and science instruction. In D. Lemke (Ed.) *Proceedings of the TechEd 2000 Conference*, Amsterdam: IOS Press.
- Kellman, P.J., Burke, T. & Hummel, J. (1999). Modeling the discovery of abstract invariants. In Stankewicz, B. & Sanocki, T. (Eds.). *Proceedings of The 7th Annual Workshop on Object Perception and Memory (OPAM)*, 48-51.
- Silva, A.B. & Kellman, P.J. (1999). Perceptual learning in mathematics: The algebra-geometry connection. In Hahn, M. & Stoness, S.C. (Eds.). *Proceedings of the Twenty-First Annual Conference of the Cognitive Science Society*, Mahwah, NJ: Lawrence Erlbaum Associates, 683-688.
- Kellman, P.J., Burke, T. & Hummel, J. (1999). Perceptual learning of abstract invariants. In Hahn, M. & Stoness, S.C. (Eds.). *Proceedings of the Twenty-First Annual Conference of the Cognitive Science Society*, Mahwah, NJ: Lawrence Erlbaum Associates, 264-269.
- Kellman, P.J., Stratchuk, T. & Hampton, S. (1999). Training pilots' pattern recognition skills: Perceptual learning modules (PLMs) in instrument flight training. In Wiggins, M. (Ed.) *Proceedings of the 2nd Annual Embry-Riddle Aeronautical University Flight Instructor Conference*, Daytona Beach, FL: Embry-Riddle University Press.
- Cunningham, D., Shipley, T.F. & Kellman, P.J. (1998). The dynamic specification of surfaces and boundaries. *Perception*, 27(4), 403-415.
- Cunningham, D.W., Shipley, T.F. & Kellman, P.J. (1998). Interactions between spatial and spatiotemporal information in spatiotemporal boundary formation, *Perception & Psychophysics*, 60(5), 839-851.
- Hummel, J. & Kellman, P.J. (1998). Finding the Pope in the pizza: Abstract invariants and constraints in perceptual learning. Commentary on P. Schyns, R. Goldstone, & J. Thibaut, The development of features in object concepts. *Behavioral and Brain Sciences*, 21, 30.
- Kellman, P.J., Yin, C. & Shipley, T.F. (1998). A common mechanism for illusory and occluded object completion. *Journal of Experimental Psychology: Human Perception & Performance*, Vol. 24, No. 3, 859-869.
- Yin, C., Kellman, P.J. & Shipley, T.F. (1997). Surface completion complements boundary interpolation. *Perception*, special issue on surface appearance, 26, 1459-1479.
- Kellman, P.J. (1997). From chaos to coherence: How the visual system recovers objects. *Psychological Science Agenda* of the American Psychological Association, 10(4), 8-9.
- Shipley, T.F. & Kellman, P.J. (1996). Spatiotemporal boundary formation: The role of local motion signals in boundary perception. *Vision Research*, Vol. 37, No. 10, 1281-1293.
- Kellman, P.J. (1995). Infant cognition. In *International Yearbook of Science and Technology*, New York: McGraw-Hill.
- Kellman, P.J. & Kaiser, P.J. (1995). Extracting object motion without distance information: Combining constraints from optic flow and binocular disparity. *Journal of the Optical Society of America (A)*, Vol. 12, No. 3.
- Shipley, T. F. & Kellman, P. J. (1994). Optical tearing in spatiotemporal boundary formation: When do local element motions produce boundaries, form and global motion? *Spatial Vision*, Vol. 7, No. 4, 323-339.
- Shipley, T.F. & Kellman, P.J. (1994). Spatiotemporal boundary formation. *Journal of Experimental Psychology: General*, Vol. 123, No. 1, 3-20.

- Kellman, P.J. & Kaiser, M.K. (1994). Perceptual learning modules in flight training. *Proceedings of the 38th Annual Meeting of the Human Factors and Ergonomics Society*, 1183-1187.
- Slater, A., Johnson, S.P., Kellman, P. & Spelke, E. (1994). The role of three-dimensional depth cues in infants' perception of partly occluded objects. *Early Development*, Vol. 3(3), 187-191.
- Shipley, T. F. Cunningham, D. W., & Kellman, P. J. (1993). Spatiotemporal stereopsis. *Proceedings of the Seventh International Conference on Event Perception and Action*, 279-283.
- Kellman, P.J. & Shipley, T.F. (1992). Visual interpolation in object perception. *Current Directions in Psychological Science*. Volume 1, No. 6, 193-199.
- Shipley, T.F. & Kellman, P.J. (1992). Strength of visual interpolation depends on the ratio of physically-specified to total edge length. *Perception & Psychophysics*, **52**(1), 97-106.
- Hofsten, C. von, Kellman, P.J. & Putaansuu, J. (1992). Young infants' sensitivity to motion parallax. *Infant Behavior & Development*, **15**, 245-264.
- Kellman, P.J. (1992). Perception, conception and self-awareness: A comment on Butterworth. *Psychological Inquiry*.
- Shipley, T.F. & Kellman, P.J. (1992). Perception of partly occluded objects and illusory figures: Evidence for an identity hypothesis. *Journal of Experimental Psychology: Human Perception & Performance*, Vol. **18**, No. 1, 106-120.
- Kellman, P.J. & Shipley, T. (1991). A theory of visual interpolation in object perception. *Cognitive Psychology*, **23**, 141-221.
- Shipley, T.F. & Kellman, P.J. (1990). The role of discontinuities in the perception of subjective contours. *Perception & Psychophysics*, **48**(3), 259-270.
- Sedney, K., Lerner, N., Kellman, P. & Denham, S. (1989). *Childhood drownings in residential pools*. Report to National Institute of Child Health and Human Development. (Contract #NO1-HD-8-2912 to COMSIS Corp.).
- Kellman, P. (1988). Inquiries into the origins of the mind: Blooming and still buzzing. *Contemporary Psychology*, **33**(7), 590-592.
- Sedney, K., Lerner, N., Cannon-Bowers, J. & Kellman, P. (1987). *Evaluation of swimming pool protective devices*. Report to US Consumer Product Safety Commission. (Contract #CPSC-P-87-1143 to COMSIS Corp.).
- Kellman, P. J. & Short, K. R. (1987). Development of three-dimensional form perception. *Journal of Experimental Psychology: Human Perception & Performance*, **13**(4), 545-557.
- Kellman, P. J. Gleitman, H. & Spelke, E. S. (1987). Object and observer motion in the perception of objects by infants. *Journal of Experimental Psychology: Human Perception & Performance*, **13**(4), 586-593.
- Kellman, P. (1987). Review of *The Origins of Logic: One to Two Years*, by Jonas Langer, *Child Development Abstracts and Bibliography*, **61**, 101-2.
- Kellman, P. J. Von Hofsten, C. & Soares, J. (1987). Concurrent motion in infant event perception. *Infant Behavior and Development*, **10**, 1-10.
- Kellman, P. J., Spelke, E. S. & Short, K. R. (1986). Infant perception of object unity from translatory motion in depth and vertical translation. *Child Development*, **57**(1), 72-86.
- Kellman, P. J. (1984). Perception of three-dimensional form by human infants. *Perception & Psychophysics*, **36**(4), 353-358.

- Kellman, P. J. & Cohen, M. H. (1984). Kinetic subjective contours. *Perception & Psychophysics*, **35**(3), 237-244.
- Kellman, P. J. & Spelke, E. S. (1983). Perception of partly occluded objects in infancy. *Cognitive Psychology*, **15**, 483-524.

Book Chapters

- Palmer, E.M. & Kellman, P.J. (2016). The aperture capture illusion. In D. Todorovic and A.G. Shapiro, Eds., *Oxford Compendium of Visual Illusions*, NY: Oxford University Press.
- Kellman, P.J. & Massey, C. M. (2013). Perceptual learning, cognition, and expertise. In Ross, B. (Ed.). *Psychology of Learning and Motivation, Volume 58*, Academic Press, Elsevier, Inc.
- Kellman, P.J., Garrigan, P.B. & Erlikhman (2013). Challenges in understanding visual shape perception and representation: Bridging subsymbolic and symbolic coding. In S. J. Dickinson & Z. Pizlo (Eds.), *Shape perception in human and computer vision: An interdisciplinary perspective*. London: Springer, pp. 249-274.
- Massey, C.M., Kellman, P.J., Roth, Z. & Burke, T. (2010). Perceptual learning and adaptive learning technology: Developing new approaches to mathematics learning in the classroom. In Stein, N.L. (Ed.), *Developmental and learning sciences go to school: Implications for education*. NY: Taylor & Francis.
- Kellman, P.J., Garrigan, P., Palmer, E.M. (2010). 3-D and spatiotemporal interpolation in object and surface formation. In C. W. Tyler (Ed.) *Computer vision: From surfaces to objects*. London: Chapman Hall Press.
- Kellman, P.J. & Garrigan, P.B. (2007). Segmentation, grouping, and shape: Some Hochbergian questions. In M. A. Peterson, B. Gillam & H. A. Sedgwick, (Eds.) *Julian Hochberg on the perception of pictures, films, and the world*, NY: Oxford University Press.
- Kellman, P.J. & Arterberry, M.A. (2006). Infant visual perception. In R. Siegler and D. Kuhn (Eds.), *Handbook of Child Psychology, Sixth Edition, Volume 2: Cognition, Perception, and Language*. New York: Wiley.
- Kellman, P.J. (2003). Segmentation and grouping in object perception: A 4-dimensional approach. In M. Behrmann and R. Kimchi (Eds.). *Perceptual Organization in Vision: Behavioral and Neural Perspectives: The 31st Carnegie Symposium on Cognition*. Hillsdale, NJ: Erlbaum.
- Kellman, P.J. (2002). Perceptual learning. In R. Gallistel (Ed.), *Stevens' handbook of experimental psychology, third edition*, Vol. 3 (Learning, motivation and emotion), John Wiley & Sons.
- Kellman, P.J., Guttman, S. & Wickens, T. (2001). Geometric and neural models of contour and surface interpolation in visual object perception. In Shipley, T.F. & Kellman, P.J. (Eds.) *From fragments to objects: Segmentation and grouping in vision*. Elsevier Press.
- Kellman, P.J. (2000). An update on Gestalt Psychology. In B. Landau, J. Jonides, E. Newport & J. Sabini (Eds.), *Essays in Honor of Henry and Lila Gleitman*, Cambridge, MA: MIT Press.
- Kellman, P.J. and Banks, M.S. (1997). Infant visual perception. In R. Siegler and D. Kuhn (Eds.), *Handbook of Child Psychology, Fifth Edition, Volume 2: Cognition, Perception, and Language*. New York: Wiley, 103-146.
- Kellman, P.J. (1996). The origins of object perception. In Gelman, R. & Au, T. (Eds.), *Handbook of Perception and Cognition, Volume 8: Perceptual and Cognitive Development*, Academic Press.

- Kellman, P.J. (1995). Ontogeny of visual space and motion perception. In Epstein, W. & Rogers, S. (Eds.), *Handbook of Perception and Cognition, Volume 5: Perception of Space and Motion*, Academic Press.
- Kellman, P. J. (1992). Kinematic foundations of perceptual development. In Granrud, C. (Ed.), *Development of Perception: The 1989 Carnegie-Mellon Symposium on Cognition*, Hillsdale, NJ: Erlbaum.
- Kellman, P. J. & von Hofsten, C. (1992). The world of the moving infant: Perception of motion, stability and space. In Rovee-Collier, C. & Lipsitt, L. (Eds.), *Advances in Infancy Research*, Norwood, NJ: Ablex.
- Kellman, P. & Loukides, M.G. (1987). An object perception approach to static and kinetic subjective contours. In Meyer, G. & Petry, G., (Eds.), *The Perception of Illusory Contours*, New York: Springer-Verlag, 151-164.
- Kellman, P.J. (1987). Theories of perception and research in perceptual development. In Yonas, A. (Ed.), *Perceptual Development in Infancy: The Minnesota Symposia on Child Psychology*, Vol. 20, 267-281.
- Baron, J., Treiman, R., Freyd, J. & Kellman, P. J. (1979). Spelling and reading by rule. In Frith, U. (Ed.), *Studies in spelling*. London: Academic Press.

Published Abstracts

Combined Effects of Multiple Scene Cues on the Perceptual Strengths of Promiscuously Interpolated Contou

- Baker, N. & Kellman, P.J. (2019). Constant curvature representations of object shape. *Journal of Vision*. 2019; 19(10).
- Mettler, E., Phillips, A., Burke, T., Massey, C., Garrigan, P. & Kellman, P.J. (2019). Perceptual learning benefits from strategic scheduling of passive presentations and active, adaptive learning. *Journal of Vision*. 2019; 19(10).
- Carrigan, S. & Kellman, P.J. (2019). From early contour linking to perception of continuous objects: Specifying scene constraints in a two-stage model of amodal and modal completion. *Journal of Vision*. 2019; 19(10).
- Kellman, P.J., Erlikhman, G., Baker, N. & Lu, H. (2019). Recursive networks reveal illusory contour classification images. *Journal of Vision*. 2019; 19(10).
- Baker, N., Lu, H., Erlikhman, G., & Kellman, P.J. (2018). Deep convolutional networks do not make classifications based on object shape. *Journal of Vision*. 2018; 18(10):904-904. doi: 10.1167/18.10.904.
- Kellman, P.J., Mettler, E., & Bufford, C. A. (2018). The psychophysics of algebra: Mathematics perceptual learning interventions produce lasting changes in the perceptual encoding of mathematical objects. *Journal of Vision*. 2018; 18(10):1073-1073. doi: 10.1167/18.10.1073.
- Baker, N., Erlikhman, G., Lu, H. & Kellman, P. J. (2017). Deep convolutional networks do not make classifications based on object shape. *Abstracts of the Psychonomic Society*, Vol. 22, 257.
- Kellman, P. J., Bufford, C. A., & Mettler, E. (2017). The psychophysics of algebra: Mathematics perceptual learning interventions produce measurable and lasting changes in the perceptual encoding of mathematical objects. *Abstracts of the Psychonomic Society*, Vol. 22, 27.
- Carrigan, S.B, and Kellman, P.J. (2017). Separating perception and recognize in amodal completion: Dot localization with regular patterns. *Journal of Vision*. 2017; 17(10):1370-1370. doi: 10.1167/17.10.1370

- Kellman, P.J., Baker, N., Erlikhman, G. & Lu, H. (2017). Classification images reveal that deep learning networks fail to perceive illusory contours. *Journal of Vision*. 2017; 17(10):569-569. doi: 10.1167/17.10.569
- Baker, N. & Kellman, P.J. (2017). Psychophysical investigations into skeletal shape representations. *Journal of Vision*. 2017; 17(10):1379-1379. doi: 10.1167/17.10.1379
- Mettler, E., Massey, C.M. & Kellman, P.J. (2016). Learning to mastery criteria: Comparisons of adaptive and fixed spacing in chemistry and geography. *Abstracts of the Psychonomic Society, Vol. 21*, 226.
- Kellman, P.J., Massey, C.M. & Mettler, E.M. (2016). Spacing and adaptive learning: Common principles across item learning and perceptual learning. *Abstracts of the Psychonomic Society, Vol. 21*, 70.
- Carrigan, S. B. & Kellman, P. J. (2016). Local and global amodal completion: Revealing separable processes using a dot localization method. *Perception*, Vol. 45(S2), 35.
- Kellman, P. J., Ehrlichman, G. & Carrigan, S. (2016). Is there a common mechanism for path integration and illusory contour formation? *Journal of Vision*. 2016; 16(12):311-311. doi: 10.1167/16.12.311
- Carrigan, S. & Kellman, P. J. (2016). Differentiating local and global processes in amodal completion: Dot localization with familiar logos. *Journal of Vision*. 2016; 16(12):310-310. doi: 10.1167/16.12.310
- Baker, N. & Kellman, P.J. (2016). Temporal properties of abstract shape representation. *Journal of Vision*. 2016; 16(12):789-789. doi: 10.1167/16.12.789
- Bufford, C.A. & Kellman, P.J. (2015). Perceptual learning in mathematics produces durable encoding improvements (Published abstract). In Noelle, D. C., Dale, R., Warlaumont, A. S., Yoshimi, J., Matlock, T., Jennings, C. D., & Maglio, P. P. (Eds.) *Proceedings of the 37th Annual Meeting of the Cognitive Science Society*. Austin, TX: Cognitive Science Society, 2858.
- Thai, K.P., Krasne, S. & Kellman, P.J. (2015). Perceptual learning with adaptively triggered comparisons (Published abstract). In Noelle, D. C., Dale, R., Warlaumont, A. S., Yoshimi, J., Matlock, T., Jennings, C. D., & Maglio, P. P. (Eds.) *Proceedings of the 37th Annual Meeting of the Cognitive Science Society*. Austin, TX: Cognitive Science Society, 3000.
- Bufford, C., & Kellman, P. (2015). Mathematics perceptual learning causes lasting information encoding gains. In P. Davis-Kean, R. S. Dalal, P. Garraghty, E. T. Gershoff, J. Holmes, R. Kievit, T. M. Olino, D. B. Samuel, M. Shiota, K. Vohs, & E. Wagenmakers (Eds.), *Proceedings of the 27th Annual Conference of the Association for Psychological Science*.
- Erlikhman, G. & Kellman, P.J. (2015). Mechanisms of spatiotemporal boundary formation. *Journal of Vision*, 15(12), 521. doi:10.1167/15.12.521
- Kellman, P., & Erlikhman, G. (2015). Understanding and modeling spatiotemporal boundary formation. *Journal of Vision*, 15(12), 525. doi:10.1167/15.12.525
- Carrigan, S., Palmer, E., & Kellman, P. (2015). Differentiating local and global processes in amodal completion through dot localization. *Journal of Vision*, 15(12), 1123. doi:10.1167/15.12.1123
- Mettler, E. & Kellman, P.J. (2014). A comparison of adaptive and fixed schedules of practice in fact learning. *Abstracts of the Psychonomic Society, Madison, WI, Vol. 19*, 127.
- Erlikhman, G., Caplovitz, G., & Kellman, P. (2014). Properties of spatiotemporal boundary formation. *Journal of Vision*, 14(10), 61. doi:10.1167/14.10.61
- Moses, R., Ghose, T., Erlikhman, G., & Kellman, P. J. (2014). Perceived occlusion velocity for fully visible and fragmented shapes. *Journal of Vision*, 14(10), 249. doi:10.1167/14.10.249

- Kellman, P.J. (2013). Perceptual and adaptive learning technologies in education and training. *Perception*, **42**, ECVF Abstract Supplement, 11.
- Caplovitz, G., Erlikhman, G., Lago, J., & Kellman, P. (2013). Neural correlates of spatiotemporal boundary formation (SBF). *J Vision* 13(9): 58; doi:10.1167/13.9.58
- Erlikhman, G., Ghose, T., Garrigan, P., Mnookin, J., Dror, I., Charleton, D., & Kellman, P. (2013). Fingerprint matching expertise and its determinants. *J Vision* 13(9): 51; doi:10.1167/13.9.51
- Hasegawa, H., Unuma, H., & Kellman, P.J. (2013). Perceptual learning of facial expressions. *J Vision* 13(9): 254; doi:10.1167/13.9.254
- Erlikhman, G., Ghose, T., & Kellman, P. (2012). Contours and surfaces affect stereoscopic depth perception in dynamically specified displays. *J Vision* 12(9): 222; doi:10.1167/12.9.222
- Kellman, P., Erlikhman, G., Mansolf, M., Fillinich, R., & Iancu, A. (2012). Modeling spatiotemporal boundary formation. *J Vision* 12(9): 881; doi:10.1167/12.9.881
- Mettler, E., Erlikhman, G., Keane, B., Horowitz, T., & Kellman, P. (2012). Further evidence for automatic, feature-based grouping in multiple object tracking. *J Vision* 12(9): 458; doi:10.1167/12.9.458
- Papathomas, T., Keane, B., Lu, H., Silverstein, S., & Kellman, P. (2012). Measuring the effects of belief on Kanizsa shape discrimination and illusory contour formation: A replication. *J Vision* 12(9): 893; doi:10.1167/12.9.893
- Unuma, H., Hasegawa, H., & Kellman, P. (2012). Perceptual learning in jigsaw puzzle. *J Vision* 12(9): 688; doi:10.1167/12.9.688
- Erlikhman, G., Ghose, T. & Kellman, P.J. (2011). Spatiotemporal contour interpolation in four dimensions *J Vision* 11(11): 1046; doi:10.1167/11.11.1046
- Unuma, H., Hasegawa, H. & Kellman, P.J. (2011). A comparison of object interpolation in complex motions. *J Vision* 11(11): 1090; doi:10.1167/11.11.1090
- Ghose, T., Erlikhman, G., Kellman P.J. (2011). Spatiotemporal object formation: Contour vs surface interpolation. *Perception*, 40 ECVF Abstract Supplement, 59.
- Garrigan, P.B. and Kellman. P.J. (2011). Constant curvature parts-based representation of contour shape. *J Vision* 11(11): 1098; doi:10.1167/11.11.1098
- Thai, K.P. & Kellman, P.J. (2011). Basic information processing effects from perceptual learning in complex, real-world domains. *J Vision* 11(11): 1028; doi:10.1167/11.11.1028
- Mettler, E., Keane, B., Erlikhman, G. & Horowitz, T. (2011). Automatic feature-based grouping during multiple object tracking. *J Vision* 11(11): 287; doi:10.1167/11.11.287
- Mettler, E. & Kellman, P.J. (2010). Adaptive sequencing in perceptual learning. *Journal of Vision*, 10(7): 1098; doi:10.1167/10.7.1098
- Keane, B. & Kellman, P.J. (2010). Evidence for a modular filling-in process during contour interpolation. *J. Vision* 10(7): 1183; doi:10.1167/10.7.1183
- Unuma, H., Hasegawa, H. & Kellman, P.J. (2010). Interpolation of expanding/contracting objects behind an occluding surface. *J Vision* 10(7): 1210; doi:10.1167/10.7.1210
- Ghose, T. & Kellman, P.J. (2010). Measuring size of a never present object: Visual object formation through spatio-temporal interpolation. Fechner day 2010, Padova, Italy. In A. Bastianelli et al., Proceedings of the International Society for Psychophysics.
- Unuma, H., Hasegawa, H., & Kellman, P. J. (2009). Strength of contour interpolation behind a moving occluder revealed by a dot localization task [Abstract]. *Journal of Vision*, 9(8):907, 907a, <http://journalofvision.org/9/8/907/>, doi:10.1167/9.8.907.
- Mettler, E., & Kellman, P. (2009). Concrete and abstract perceptual learning without conscious

- awareness [Abstract]. *Journal of Vision*, 9(8):871, 871a, <http://journalofvision.org/9/8/871/>, doi:10.1167/9.8.871.
- Keane, B. P., Mettler, E., & Kellman, P. J. (2009). Contour interpolation automatically directs attention in multiple object tracking [Abstract]. *Journal of Vision*, 9(8):252, 252a, <http://journalofvision.org/9/8/252/>, doi:10.1167/9.8.252.
- Kellman, P. J., Keane, B. P., & Lu, H. (2009). Filling-in regions influence real and interpolated shape via lightness induction [Abstract]. *Journal of Vision*, 9(8):918, 918a, <http://journalofvision.org/9/8/918/>, doi:10.1167/9.8.918.
- Keane, B. P., Silverstein, S. & Kellman, P. J., (2009). Achromatic surface color depends on filling in shape. *J Vision* 11(11): 1047; doi:10.1167/11.11.1047
- Ghose, T., Liu, J., & Kellman, P. (2009). Recovering metric object properties through spatiotemporal interpolation: What is the size of an object that is never present in the stimulus? [Abstract]. *Journal of Vision*, 9(8):911, 911a, <http://journalofvision.org/9/8/911/>, doi:10.1167/9.8.911.
- Palmer, E., Brown, C., Bates, C., Clausner, T., & Kellman, P. (2009). Imagined perspective modulates cue effectiveness in visual search of air traffic control displays [Abstract]. *Journal of Vision*, 9(8):1212, 1212a, <http://journalofvision.org/9/8/1212/>, doi:10.1167/9.8.1212.
- Clausner, T.C., Palmer, E.M., Brown, C.M., Bates, C.F. & Kellman, P.J. (2009). Conceptualization of perceptual cues guided by metaphor, depth, and imagined perspective. *Abstracts of the 50th Annual Meeting of the Psychonomic Society* (p. 102), Boston, MA.
- Mettler, E. & Kellman, P. Adaptive sequencing in perceptual learning. (2009). *Abstracts of the 50th Annual Meeting of the Psychonomic Society* (p. 88), Boston, MA.
- Clausner, T.C., Palmer, E.M. & Kellman, P.J. (2008). Conceptualization of spatial altitude guided by language and perception. *Abstracts of the 49th Annual Meeting of the Psychonomic Society*, Chicago, IL.
- Son, J., Massey, C., Roth, Z., Longmire, W., Burke, T., Zucker, J. & Kellman, P. J. (2008). Perceptual learning in mathematics education. In B. C. Love, K. McRae, & V. M. Sloutsky (Eds.), *Proceedings of the 30th Annual Conference of the Cognitive Science Society* (p. 2366). Austin, TX: Cognitive Science Society.
- Hilger, J.D. & Kellman, P.J. (2008). Misalignment constraints on visual interpolation, *Journal of Vision*, Volume 8, Number 6, p. 583a, <http://journalofvision.org/8/6/583/>
- Unuma, H., Hasegawa, H. & Kellman, P.J. (2008). Contour and surface integration behind moving occluder, *Journal of Vision*, Vol. 8, Number 6, p. 588a, <http://journalofvision.org/8/6/588/>
- Mettler, E., Keane, B. & Kellman, P.J. (2008). Contour interpolation affects multiple object tracking, *Journal of Vision*, Vol. 8, Number 6, p. 507a, <http://journalofvision.org/8/6/507/>
- Keane, B., Lu, H. & Kellman, P.J. (2008). Contour interpolation and lightness induction mechanisms interact to produce classification image features in a shape discrimination task, *Journal of Vision*, Vol. 8, Number 6, p. 584a, <http://journalofvision.org/8/6/584/>
- Clausner, T.C., Palmer, E.M. & Kellman, P.J. (2008). Conceptualization in language and its relation to perception. [Abstract] In B. C. Love, K. McRae, & V. M. Sloutsky (Eds.), *Proceedings of the 30th Annual Conference of the Cognitive Science Society* (p. 197).
- Palmer, E., Clausner, T. & Kellman, P.J. (2008). Visual search in air traffic control: Altitude correlated depth cues enhance conflict detection, *Journal of Vision*, Volume 8, Number 6, p. 324a, <http://journalofvision.org/8/6/324/>
- Keane, B., Kellman, P.J. & Elwell, C. (2007). Classification images reveal differences between spatial and spatiotemporal contour interpolation. *Journal of Vision*, Volume 7, Number 9, <http://journalofvision.org/7/9/603/>

- Unuma, H., Hasegawa, H. & Kellman, P.J. (2007). Spatiotemporal interpolation behind moving occluder. *Journal of Vision*, Volume 7, Number 9, <http://journalofvision.org/7/9/610/>
- Mettler, E. & Kellman, P.J. (2006). Unconscious discovery in concrete and abstract perceptual learning. *Abstracts of the Psychonomic Society, Vol. 11*, 17.
- Hilger, J.D., Fantoni, C., Gerbino, W. & Kellman, P.J. (2006). Surface interpolation and slant anisotropy, *Journal of Vision*, <http://journalofvision.org/6/6/334/>
- Unuma, H., Hasegawa, H. & Kellman, P.J. (2006). Spatiotemporal contour interpolation and shape discrimination. *Journal of Vision*, <http://journalofvision.org/6/6/333/>
- Keane, B.P. & Kellman, P.J. (2006). Classification images reveal interpolation in dynamic displays. *Journal of Vision*, <http://journalofvision.org/6/6/335/>
- Fantoni, C., Gerbino, W. & Kellman, P. (2005). Amodal unification of surfaces with torsion requires visual approximation. *Perception*.
- Garrigan, P. & Kellman, P.J. (2005). Contour shape effects on search performance: Evidence for constant curvature coding. *Journal of Vision*, <http://journalofvision.org/5/8/468/>
- Kalar, D.J., Garrigan, P. & Kellman, P.J. (2005). Second-order contour discontinuities in segmentation and shape representation. *Journal of Vision*, <http://journalofvision.org/5/8/212/>
- Fantoni, C., Hilger, J.D., Gerbino, W. & Kellman, P.J. (2005). Surface interpolation and 3D relatability. *Journal of Vision*, <http://journalofvision.org/5/8/341/>
- Hilger, J.D. & Kellman, P.J. (2005). Tolerance for misalignment in contour interpolation: retinal or relational? *Journal of Vision*, <http://journalofvision.org/5/8/571/>
- Kellman, P. & Garrigan, P. (2004). Is perceptual learning constrained to operate through perceptual (not sensory) representations? *Journal of Vision*, <http://journalofvision.org/4/8/305/>
- Fantoni, C., Gerbino, W., & Kellman, P. (2004). Approximation, torsion, and amodally-unified surfaces. *Journal of Vision*, <http://journalofvision.org/4/8/726/>
- Hass, R.W., Shipley, T.F., & Kellman, P.J. (2004). Decrease in illusory contour completion with retinal eccentricity is not due to loss of phase information, *Journal of Vision* <http://journalofvision.org/4/8/733/>
- Kalar, D.J., Garrigan, P., Kellman, P., & Wickens, T.D. (2004). A unified operator for contour interpolation, *Journal of Vision*, <http://journalofvision.org/4/8/791/>
- Kellman, P.J., Garrigan, P., Kalar, D. & Shipley, T.F. (2003). Good continuation and relatability: Related but distinct principles of perceptual organization. *Journal of Vision*.
- Shipley, T.F. & Kellman, P.J. (2003). Retinal anisotropies in illusory contour formation. *Journal of Vision*.
- Palmer, E. & Kellman, P.J. (2003). (Mis)Perception of motion and form after occlusion: Anorthoscopic perception revisited. *Journal of Vision*.
- Guttman, S.E., Kellman, P.J. & Sekuler, A.B. (2003). Temporal variations in visual completion: A reflection of spatial limits? *Journal of Vision*.
- Palmer, E. & Kellman, P.J. (2002). Underestimation of velocity after occlusion causes the aperture-capture illusion. [Abstract]. *Journal of Vision*, 2(7), 477a, <http://journalofvision.org/2/7/477/>
- Garrigan, P. & Kellman, P.J. (2002). Three-dimensional contour interpolation: Testing the 90-degree constraint. [Abstract]. *Journal of Vision*, 2(7), 356a, <http://journalofvision.org/2/7/356/>
- Guttman, S. E., & Kellman, P. J. (2002). Do spatial factors influence the microgenesis of illusory contours? [Abstract]. *Journal of Vision*, 2(7), 355a, <http://journalofvision.org/2/7/355/>
- Palmer, E. & Kellman, P.J. (2001). The aperture capture effect: Misperceived forms in dynamic occlusion displays. [Abstract]. *Journal of Vision*, 1(3), 381a, <http://journalofvision.org/1/3/381/>

- Guttman, S.E. & Kellman, P.J. (2001). Contour interpolation: necessary but not sufficient for the perception of interpolated contours. [Abstract]. *Journal of Vision*, 1(3), 384a, <http://journalofvision.org/1/3/384/>
- Choplin, J., Huttenlocher, J. & Kellman, P.J. (2001). Perceptual discrimination and memory. [Abstract]. *Journal of Vision*, 1(3), 472a, <http://journalofvision.org/1/3/472/>
- Guttman, S.E. & Kellman, P.J. (2000). Seeing between the lines: Contour interpolation without perception of interpolated contours. *Investigative Ophthalmology and Visual Science*, **41**(4), 723.
- Kellman, P.J., Temesvary, A., Palmer, E.M. & Shipley, T.F. (2000). Separating local and global processes in object perception: Evidence from an edge localization paradigm. *Investigative Ophthalmology and Visual Science*, **41**(4), 741.
- Palmer, E.M., Kellman, P.J. & Shipley, T.F. (2000). Modal and amodal perception of dynamically occluded objects. *Investigative Ophthalmology and Visual Science*, **41**(4), 439.
- Guttman, S.E. & Kellman, P.J. (1999). Distinguishing object from observer motion in impoverished visual displays. *Investigative Ophthalmology and Visual Science*, **40**(4), 800.
- Palmer, E.M., Unuma, H. & Kellman, P.J. (1999). Spatiotemporal illusory contour perception. *Investigative Ophthalmology and Visual Science*, **40**(4), 809.
- Kellman, P.J., Palmer, E. & Shipley, T.F. (1998). Effects of velocity in dynamic object completion. *Investigative Ophthalmology & Visual Science*, **39**(4), 855.
- Cunningham, D.W., Shipley, T.F. & Kellman, P.J. (1997). The roles of spatial and spatiotemporal surface information in spatiotemporal boundary formation. *Investigative Ophthalmology & Visual Science*, **38**(4), 1005.
- Palmer, E., Kellman, P. J. & Shipley, T.F. (1997). Spatiotemporal reliability in dynamic object completion. *Investigative Ophthalmology & Visual Science*, **38**(4), 256 .
- Kellman, P.J., Yin, C. & Shipley, T.F. 3-D reliability determines 3-D object completion. (1997). Abstracts of the Psychonomic Society, **2**.
- Yin, C., Kellman, P.J. & Shipley, T.F. Surface and edge interactions in the perception of partly occluded objects. (1997). Abstracts of the Psychonomic Society, **2**.
- Yin, C., Kellman, P.J. & Shipley, T.F. (1996). Surface completion: Evidence from a depth discrimination paradigm. *Investigative Ophthalmology & Visual Science*, **37**(3).
- Cunningham, D.W., Shipley, T.F. & Kellman, P.J. (1996). Spatiotemporal boundary formation: The role of global motion signals. *Investigative Ophthalmology & Visual Science*, **37**(3), 172.
- Kellman, P.J., Machado, L., Shipley, T.F. & Li, C.C. (1996). 3-D determinants of object completion. *Investigative Ophthalmology & Visual Science*, **37**(3), 685.
- Kellman, P.J. & Shipley, T.F. (1996). Depth and motion in object completion. *Perception* supplements, 25.
- Kellman, P.J., Shipley, T.F. & Kim, J. (1996). Global and local effects in object completion: Evidence from a boundary localization paradigm. Abstracts of the Psychonomic Society, **1**, 34.
- Shipley, T.F., Cunningham, D. & Kellman, P.J. (1995). From interpolation to extrapolation. Abstracts of the Psychonomic Society.
- Yin, C., Kellman, P.J. & Shipley, T.F. (1995). A surface spreading process complements boundary interpolation under occlusion. *Investigative Ophthalmology & Visual Science*, **36**(4).
- Kellman, P.J., Yin, C. & Shipley, T.F. (1995). A common mechanism for illusory and occluded figure completion: Evidence from hybrid displays. *Investigative Ophthalmology & Visual Science*, **36**(4).

- Shipley, T.F. & Kellman, P.J. (1994). Spatiotemporal boundary formation: Evidence for recovery of shape and motion from local motion signals. *Investigative Ophthalmology & Visual Science*, **35**(4), 1665.
- Shipley, T.F. & Kellman, P.J. (1993). Spatiotemporal boundary formation: Temporal integration occurs within a fixed 150 msec window. *Investigative Ophthalmology & Visual Science*, **34**(4), 1082.
- Shipley, T.F. & Kellman, P.J. (1992). Constraints on spatiotemporal boundary formation. *Investigative Ophthalmology and Visual Science Supplements*, **33**(4), 958.
- Shipley, T.F. & Kellman, P.J. (1991). Spatiotemporal boundary formation. *Investigative Ophthalmology and Visual Science Supplements*, **32**(4), 1279.
- Shipley, T.F. & Kellman, P.J. (1990). Perception of partly occluded objects and subjective figures: Evidence for a common process. *Investigative Ophthalmology and Visual Science Supplements*, **31**(4), 106.
- Kellman, P. J., Power, L. & Shipley, T. F. (1989). Visual interpolation in object perception: Evidence from a kinematic occlusion paradigm. *Proceedings of the Fifth International Conference on Event Perception and Action*, 78.
- Kellman, P. J. & Loukides, M. G. (1986). Configuration and brightness as causal factors in subjective contours: Two direct tests (abstract). *Perception & Psychophysics*, **39**(3), 212.

PATENTS

- System and Method for Representation of Aircraft Altitude using Natural Perceptual Dimensions*. Inventors: P. Kellman, T. Clausner, E. Palmer. (US PTO# 7408552, awarded, 6/08; assignee: Raytheon Corp.; European patent awarded 3/05.)
- System and Method for Adaptive Learning*. Inventor: P. Kellman. (US PTO #7052277, awarded 4/2006)
- System and Method for Perceptual Learning*. Inventor: P. Kellman (US PTO #9299265, awarded 11/2015)

PRESENTATIONS AT PROFESSIONAL MEETINGS

- Carrigan, S. & Kellman, P.J. (2020). Combined effects of multiple scene cues on the perceptual strengths of promiscuously interpolated contours. Talk presented at the *20th Annual Meeting of the Vision Sciences Society*, June, 2020.
- Mettler, E., Massey, C., Burke, T.B., & Kellman, P. J. (2020). Comparing adaptive and random spacing schedules during learning to mastery criteria. Paper presented at the *42st Annual Conference of the Cognitive Science Society*, July, 2020.
- Mettler, E., Massey, C., El-Ashmawy, A.K., & Kellman, P. J. (2020). Adaptive vs. fixed spacing of learning items: Evidence from studies of learning and transfer in chemistry education. Paper presented at the *42st Annual Conference of the Cognitive Science Society*, July, 2020.
- Mettler, E., Phillips, A., Massey, C., Burke, T., Garrigan, P., & Kellman, P. J. (2019). The synergy of passive and active learning modes in adaptive perceptual learning. Paper presented at the *41st Annual Conference of the Cognitive Science Society*, Montreal, QB, July, 2019.
- Baker, N. & Kellman, P.J. Constant curvature representations of object shape. Paper presented at the *19th Annual Meeting of the Vision Sciences Society*, St. Petersburg, FL, May, 2019.
- Mettler, E., Phillips, A., Burke, T., Massey, C., Garrigan, P. & Kellman, P.J. Perceptual learning benefits from strategic scheduling of passive presentations and active, adaptive learning. Paper

- presented at the *19th Annual Meeting of the Vision Sciences Society*, St. Petersburg, FL, May, 2019.
- Carrigan, S. & Kellman, P.J. From early contour linking to perception of continuous objects: Specifying scene constraints in a two-stage model of amodal and modal completion. Poster presented at the *19th Annual Meeting of the Vision Sciences Society*, St. Petersburg, FL, May, 2019.
- Kellman, P.J., Erlikhman, G., Baker, N. & Lu, H. Recursive networks reveal illusory contour classification images. Paper presented at the *19th Annual Meeting of the Vision Sciences Society*, St. Petersburg, FL, May, 2019.
- Baker, N., Kellman, P.J., Erlikhman, G. & Lu, H. Deep convolutional networks do not perceive illusory contours. Paper presented at the 40th Annual Conference of the Cognitive Science Society, Madison, WI, July, 2018.
- Cui, L., Massey, C.M. & Kellman, P.J. Perceptual learning in correlation estimation: The role of learning category organization. Paper presented at the 40th Annual Conference of the Cognitive Science Society, Madison, WI, July, 2018.
- Mettler, E., Massey, C.M., Garrigan, P. & Kellman, P.J. Enhancing adaptive learning through strategic scheduling of passive and active learning modes. Paper presented at the 40th Annual Conference of the Cognitive Science Society, Madison, WI, July, 2018.
- Kellman, P.J., Mettler, E.M. & Bufford, C.A. The psychophysics of algebra: Mathematics perceptual learning interventions produce lasting changes in the perceptual encoding of mathematical objects. Paper presented at the *18th Annual Meeting of the Vision Sciences Society*, St. Petersburg, FL, May, 2018.
- Baker, N., Lu, H., Erlikhman, G. & Kellman, P.J. Deep convolutional networks do not make classifications based on global object shape. Paper presented at the *18th Annual Meeting of the Vision Sciences Society*, St. Petersburg, FL, May, 2018.
- Kellman, P.J. Visual perception of shape in humans and deep convolutional neural networks (DCNNs). Paper presented at the *Annual Meeting of the Society of Experimental Psychologists*, University of Arizona, March, 2018.
- Baker, N., Erlikhman, G., Lu, H. and Kellman, P.J. Deep convolutional networks do not make classifications based on object shape. Paper presented at the *58th Annual Meeting of the Psychonomic Society*, Vancouver, BC, November, 2017.
- Kellman, P.J., Bufford, C.A. & Mettler, E.M. The psychophysics of algebra: Mathematics perceptual learning interventions produce measurable and lasting changes in the perceptual encoding of mathematical objects. Paper presented at the *58th Annual Meeting of the Psychonomic Society*, Vancouver, BC, November, 2017.
- Baker, N., Lu, H., Erlikhman, G. and Kellman, P.J. Deep convolutional networks do not make classifications based on object shape. Paper presented at the *2017 Meeting of the Configural Processing Consortium*, Vancouver, BC, November, 2017.
- Kellman, P.J. Perceptual learning, cognition, and expertise: Implications for scientific visualization. Invited keynote address, *2017 Gordon Conference on Scientific Visualization*, Bates College, Lewiston, ME, August, 2017.
- Kellman, P.J., Baker, N., Erlikhman, G. & Lu, H. Classification images reveal that deep learning networks fail to perceive illusory contours. Paper presented at the *17th Annual Meeting of the Vision Sciences Society*, St. Petersburg, FL, May, 2017.
- Carrigan, S. & Kellman, P.J. Separating perception and recognition in amodal completion: Dot localization with regular patterns. Poster presented at the *17th Annual Meeting of the Vision Sciences Society*, St. Petersburg, FL, May, 2017.
- Baker, N. & Kellman, P.J. Psychophysical investigations into skeletal shape representations. Poster presented at the *17th Annual Meeting of the Vision Sciences Society*, St. Petersburg, FL, May, 2017.

- Kellman, P.J. Perceptual learning, cognition, and expertise. Paper presented at the *Annual Meeting of the Society of Experimental Psychologists*, Vanderbilt University, March, 2017.
- Kellman, P.J., Carrigan, S.B. & Erlikhman, G. Path integration and illusory contours: Evidence for an intermediate representation in visual contour interpolation. 42nd Annual Interdisciplinary Conference, Breckenridge, CO, February, 2017.
- Kellman, P.J., Carrigan, S.B. & Erlikhman, G., N. & Kellman, P.J. Path integration and illusory contours: Evidence for an intermediate representation in visual contour interpolation. Paper presented at the *2016 Meeting of the Configural Processing Consortium*, Vancouver, BC, November, 2016.
- Baker, N. & Kellman, P.J. Abstract shape representation. Paper presented at the *2016 Meeting of the Configural Processing Consortium*, Vancouver, BC, November, 2016.
- Kellman, P.J., Massey, C.M. & Mettler, E.M. Spacing and adaptive learning: Common principles across item learning and perceptual learning. Paper presented at the *57th Annual Meeting of the Psychonomic Society*, Boston, MA, November, 2016.
- Mettler, E.M., Massey, C.M. & Kellman, P.J. Learning to mastery criteria: Comparisons of adaptive and fixed spacing in chemistry and geography. Paper presented at the *57th Annual Meeting of the Psychonomic Society*, Boston, MA, November, 2016.
- Kellman, P., Erlikhman, G. & Carrigan, S. Path integration and illusory contours: Evidence for an intermediate representation in visual contour interpolation. Paper presented at the 10th Annual Meeting of the Configural Processing Consortium, Boston, MA, November, 2016.
- Kellman, P.J. & Dutson, E. Learning science based simulation for training combat medics in hemorrhage control. Office of Naval Research Cognitive Science of Learning Meeting, Los Angeles, CA, Sept. 2016.
- Mettler, E.M., Massey, C.M. & Kellman, P.J. Optimal spacing requires adaptive scheduling: Evidence from comparisons of fixed and adaptive schedules of practice. Poster presented at the Annual Meeting of the American Psychological Association, Denver, CO, August, 2016.
- Thai, K.P., Krasne, S., Mettler, E.M. & Kellman, P.J. Enhancing the efficiency of perceptual learning using adaptively triggered comparisons. Poster presented at the Annual Meeting of the American Psychological Association, Denver, CO, August, 2016.
- Bufford, C.A., Thai, K.P., Ho, J., Xiong, C., Hines, C. & Kellman, P.J. Perceptual learning of abstract musical patterns: Recognizing composer style. Paper presented at the *14th International Conference on Music Perception and Cognition*, San Francisco, CA, July, 2016.
- Massey, C.M., Kregor, J.D. & Kellman, P.J. Implementing mathematics learning software successfully in urban schools: Lessons for research and practice. Paper presented at the *Annual Meeting of the American Educational Research Association*, Washington, D.C., April, 2016..
- Kellman, P.J. & Erlikhman, G. Spatiotemporal boundary formation. 41st Annual Interdisciplinary Conference, Breckenridge, CO, February, 2016.
- Carrigan, S. & Kellman, P.J. Local and global amodal completion: Revealing separable processes using a dot localization method. Poster presented at the *European Conference on Visual Perception*, Madrid, Spain, August, 2016.
- Carrigan, S. & Kellman, P.J. Differentiating local and global processes in amodal completion: Dot localization with familiar logos. Poster presented at the *16th Annual Meeting of the Vision Sciences Society*, St. Petersburg, FL, May, 2016.
- Kellman, P.J., Erlikhman, G. & Carrigan, S. Is there a common mechanism for path integration and illusory contour formation? Poster presented at the *16th Annual Meeting of the Vision Sciences Society*, St. Petersburg, FL, May, 2016.

- Baker, N. & Kellman, P.J. Temporal properties of abstract shape representation. Poster presented at the 16th Annual Meeting of the Vision Sciences Society, St. Petersburg, FL, May, 2016.
- Bufford, C., & Kellman, P. Mathematics perceptual learning causes lasting information encoding gains. In P. Davis-Kean, R. S. Dalal, P. Garraghty, E. T. Gershoff, J. Holmes, R. Kievit, T. M. Olin, D. B. Samuel, M. Shiota, K. Vohs, & E. Wagenmakers (Eds.), Proceedings of the 27th Annual Conference of the Association for Psychological Science, 2015.
- Kellman, P.J. Perceptual learning in mathematics. Invited symposium talk, Symposium on *Human Mathematical Abilities: From Intuition to the Classroom and Back*, 2015 AAAS Meeting, San Jose, CA, February, 2015
- Kellman, P.J. & Erlikhman, G. Spatiotemporal boundary formation. Keynote address, 2014 Meeting of the Configural Processing Consortium, Long Beach, CA, November, 2014.
- Bufford, C.A., Mettler, E., Geller, E. & Kellman, P.J. The psychophysics of algebra expertise: Mathematics perceptual learning interventions produce durable encoding changes. Paper presented at the 2014 meeting of the Cognitive Science Society, July, 2014.
- Thai, K.P., Massey, C.M. & Kellman, P.J. Perceptual learning in mathematics education: Inverse relations and area units. Symposium presentation at the 26th Annual Convention of the Association for Psychological Science, San Francisco, CA: May, 2014.
- Bufford, C.A., Mettler, E., Geller, E. & Kellman, P.J. Capturing mathematics perceptual learning through psychophysics. Poster presented at the 26th Annual Convention of the Association for Psychological Science, San Francisco, CA: May, 2014.
- Thai, K.P., Massey, Krasne, S. & Kellman, P.J. Teaching pattern recognition: Combined effects of perceptual learning and declarative instruction. Poster presented at the 26th Annual Convention of the Association for Psychological Science, San Francisco, CA: May, 2014.
- Krasne, S., Stevens, C. D., Kellman, P., Niemann, J.T. A perceptual and adaptive learning module for training 12-Lead ECG Interpretation. Paper presented at the Association of American Medical Colleges (AAMC) WGEA Regional Conference, University of Hawaii at Manoa, Honolulu, March 22-25, 2014.
- Krasne, S., Stevens, C. D., Kellman, P. J. A continuous assessment tool for teaching and assessing clinical pattern recognition. Poster presented at the 16th Ottawa Conference on Medical Education, Ottawa, Canada, April 25-29, 2014.
- Erlikhman, G., Caplovitz, G., & Kellman, P. Properties of spatiotemporal boundary formation. Poster presented at the 14th Annual Meeting of the Vision Sciences Society, St. Petersburg, FL, May, 2014.
- Ghose, T., Erlikhman, G. & Kellman, P. Perceived occlusion velocity for fully visible and fragmented shapes. Poster presented at the 14th Annual Meeting of the Vision Sciences Society, St. Petersburg, FL, May, 2014.
- Thai, K.P., Krasne, S. & Kellman, P.J. Teaching pattern recognition in medical education: Combined effects of perceptual learning and declarative instruction. David Geffen UCLA Medical School 4th Annual Symposium on the Learning Sciences in Medical Education, November, 2013.
- Kellman, P. Perceptual and adaptive learning technologies in education and training. Paper presented at the 2013 European Conference on Visual Perception (ECVP), Bremen, Germany, August, 2013.
- Ghose, T., Erlikhman, G., Garrigan, P., Kellman, P., Mnookin, J., Dror, I. & Charlton, D. Perception, image processing, and fingerprint matching expertise. Paper presented at the 2013

- European Conference on Visual Perception (ECVP), Bremen, Germany, August, 2013.
- Kellman, P. Unifying and applying perceptual learning. Paper presented at *Annual Interdisciplinary Conference*, Jackson, WY, February, 2013.
- Krasne S, Stevens, CD, Kellman, PJ, Craft, N. A tool for teaching pattern recognition in medical education. Paper presented at the Annual Meeting of the American Educational Research Association (AERA). April 27-May 1, 2013.
- Krasne, S., Gu, Z., Burke, T., Kellman, P., Stevens, C. D. Perceptual and adaptive learning modules (PALMs) for training clinical pattern recognition. Poster presented at the Association of American Medical Colleges (AAMC) WGEA/WGSA Regional Conference. University of California, Irvine, May 3-7, 2013.
- Caplovitz, G., Erlikhman, G., Lago, J., & Kellman, P. Neural correlates of spatiotemporal boundary formation (SBF). Poster presented at the *13th Annual Meeting of the Vision Sciences Society*, Naples, FL, May, 2013.
- Hasegawa, H., Unuma, H., & Kellman, P.J. Perceptual learning of facial expressions. Poster presented at the *13th Annual Meeting of the Vision Sciences Society*, Naples, FL, May, 2013.
- Erlikhman, G., Ghose, T., Garrigan, P., Mnookin, J., Dror, I., Charleton, D., & Kellman, P. Fingerprint matching expertise and its determinants. Poster presented at the *13th Annual Meeting of the Vision Sciences Society*, Naples, FL, May, 2013.
- Krasne, S., Burke, T., Kim, S. & Kellman, P.J. Teaching pattern recognition in medical education: A perceptual and adaptive approach. Society of Academic Emergency Medicine, Western Regional Meeting, Long Beach, CA, March, 2012.
- Erlikhman, G., Ghose, T., & Kellman, P. Contours and surfaces affect stereoscopic depth perception in dynamically specified displays. Poster presented at the *12th Annual Meeting of the Vision Sciences Society*, Naples, FL, May, 2012.
- Kellman, P., Erlikhman, G., Mansolf, M., Fillinich, R., & Iancu, A. Modeling spatiotemporal boundary formation. Poster presented at the *12th Annual Meeting of the Vision Sciences Society*, Naples, FL, May, 2012.
- Mettler, E., Erlikhman, G., Keane, B., Horowitz, T., & Kellman, P. Further evidence for automatic, feature-based grouping in multiple object tracking. Paper presented at the *12th Annual Meeting of the Vision Sciences Society*, Naples, FL, May, 2012.
- Papathomas, T., Keane, B., Lu, H., Silverstein, S., & Kellman, P. Measuring the effects of belief on Kanizsa shape discrimination and illusory contour formation: A replication. Poster presented at the *12th Annual Meeting of the Vision Sciences Society*, Naples, FL, May, 2012.
- Unuma, H., Hasegawa, H., & Kellman, P. Perceptual learning in jigsaw puzzles. Poster presented at the *12th Annual Meeting of the Vision Sciences Society*, Naples, FL, May, 2012.
- Kellman, P.J. & Erlikhman, G. Modeling spatiotemporal boundary formation. *6th Configurational Processing Consortium*, Minneapolis, MN, November, 2012.
- Krasne, S., Gu, Z., Burke, T., Kim, S., Kellman, P. Seeing the forest for the trees: Training clinical pattern recognition. Paper presented at the 2012 Association of American Medical Colleges *Research in Medical Education Conference*, (AAMC RIME), November 2-7, 2012.
- Krasne S., Burke T., Kim S., Kellman P.J. Teaching pattern recognition in medical education: A perceptual and adaptive learning approach. Paper presented at the *15th Ottawa Medical Education Conference*. Kuala Lumpur, Malaysia, March, 2012.
- Rimoin L., Burke T., Craft N., Krasne S., Kellman P.J. Perceptual and adaptive learning technology

- in medical education: The efficacy of pattern recognition in teaching dermatology to medical students. Poster presented at the *15th Ottawa Conference on Medical Education*, Kuala Lumpur, Malaysia, March, 2012.
- Kellman, P.J. Adaptive and perceptual learning technology in medical education and training. *Conference on Designing and Using Computer Simulations in Medical Education*, Los Angeles, CA, May, 2011.
- Kellman, P. Stronger climbers or smaller mountains? Discussion of IES-funded centers. Invited symposium presentation, *Society for Research on Educational Effectiveness (SREE)*, September, 2011.
- Kellman, P. Unifying perceptual learning. Invited symposium presentation, *Asia-Pacific Conference on Vision (APCV)*, July, 2011.
- Krasne, S., Hillman J., Rimoin, L., Burke, T., Kim, S., Drake, T., Craft, N. & Kellman, P. Teaching pattern recognition in medical education: A perceptual and adaptive learning approach. Poster presented at the Third Annual Symposium on the Learning Sciences in Medical Education, UCLA Medical School, November, 2011.
- Erlikhman, G., Ghose, T. & Kellman, P. Spatiotemporal contour interpolation in four dimensions. Poster presented at the *11th Annual Meeting of the Vision Sciences Society*, Naples, FL, May, 2011.
- Keane, B., Silverstein, S. & Kellman, P. Achromatic surface color depends on filling in shape. Poster presented at the *11th Annual Meeting of the Vision Sciences Society*, Naples, FL, May, 2011.
- Unuma, H., Hasegawa, H. & Kellman, P.J. A comparison of object interpolation in complex motions. Poster presented at the *11th Annual Meeting of the Vision Sciences Society*, Naples, FL, May, 2011.
- Garrigan, P. & Kellman, P.J. Constant curvature parts-based representation of contour shape. Poster presented at the *11th Annual Meeting of the Vision Sciences Society*, Naples, FL, May, 2011.
- Thai, K.P. & Kellman, P.J. Basic information processing effects from perceptual learning in complex, real-world domains. Poster presented at the *11th Annual Meeting of the Vision Sciences Society*, Naples, FL, May, 2011.
- Mettler, E., Keane, B., Erlikhman, G., Horowitz, T., & Kellman, P. Automatic feature-based grouping during multiple object tracking. Poster presented at the *11th Annual Meeting of the Vision Sciences Society*, Naples, FL, May, 2011.
- Kellman, P.J. Perceptual and adaptive learning technologies in medical learning. *AIBS Onsite Review: The Application of Novel Technologies in Computer-Mediated Medicine*, University of California, Los Angeles Center for Advanced Surgical and Interventional Technology, July, 2010.
- Kellman, P.J. From early visual mechanisms to contours and objects. *5th Configural Processing Consortium*, St. Louis, MO, November, 2010.
- Kellman, P.J. Perceiving and representing contours and objects: Segmentation, grouping and shape. Invited symposium presentation, Shape Processing Workshop, European Conference on Computer Vision (ECCV), Crete, Greece, September, 2010.
- Kellman, P.J. Visual perception of contours and objects: segmentation, grouping, and shape. Association for Advancement of Artificial Intelligence (AAAI) Symposium on Cognitive Shape Processing, Stanford University, March, 2010
- Mettler, E., Lu, H. & Kellman, P. Abstract perceptual learning of hidden patterns. Poster presented at the *Annual Meeting of the Cognitive Science Society*, July, 2010.
- Mettler, E. & Kellman, P.J. Adaptive sequencing in perceptual learning, Paper presented at the *10th Annual Meeting of the Vision Sciences Society*, Naples, FL, May, 2010.

- Keane, B. & Kellman, P.J. Evidence for a modular filling-in process during contour interpolation. Paper presented at the *10th Annual Meeting of the Vision Sciences Society*, Naples, FL, May, 2010.
- Unuma, H., Hasegawa, H. & Kellman, P.J. Interpolation of expanding/contracting objects behind an occluding surface. Paper presented at the *10th Annual Meeting of the Vision Sciences Society*, Naples, FL, May, 2010.
- Kellman, P.J. Mystics and bookkeepers: Contrasting approaches to perceptual organization. *4th Configural Processing Consortium Annual Meeting*, November, 2009.
- Kellman, P.J., Burke, T., & Massey, C. Adaptive sequencing technology in item and category learning. Invited symposium talk, *Cognitive Development Society Annual Meeting*, San Antonio, TX: October, 2009.
- Kellman, P.J., Massey, C., Roth, Z., & Burke, T., Building expertise in mathematics through perceptual learning technology, Invited symposium talk, *Association for Psychological Science Annual Meeting*, San Francisco, CA: May, 2009.
- Ghose, T., Liu, J. & Kellman, P.J. Recovering metric object properties through spatiotemporal interpolation: What is the size of an object that is never present in the stimulus? *9th Annual Meeting of the Vision Sciences Society*, Naples, FL, May, 2009.
- Mettler, E. & Kellman, P.J. Unconscious and abstract perceptual learning of hidden patterns, *9th Annual Meeting of the Vision Sciences Society*, Naples, FL, May, 2009.
- Unuma, H., Hasegawa, H. & Kellman, P.J. (2009). Strength of contour interpolation behind a moving occluder revealed by a dot localization task. *9th Annual Meeting of the Vision Sciences Society*, Naples, FL, May, 2009
- Kellman, P.J., Keane, B., Lu, H. & Kellman, P.J. (2009). Filled-in regions influence real and interpolated shape via lightness induction. *9th Annual Meeting of the Vision Sciences Society*, Naples, FL, May, 2009.
- Keane, B. P., Mettler, E., & Kellman, P. J. (2009). Contour interpolation automatically directs attention in multiple object tracking. *9th Annual Meeting of the Vision Sciences Society*, Naples, FL, May, 2009.
- Palmer, E., Brown, C., Bates, C., Clausner, T., & Kellman, P. (2009). Imagined perspective modulates cue effectiveness in visual search of air traffic control displays. *9th Annual Meeting of the Vision Sciences Society*, Naples, FL, May, 2009.
- Clausner, T.C., Palmer, E.M., Brown, C.M., Bates, C.F. & Kellman, P.J. (2009). Conceptualization of perceptual cues guided by metaphor, depth, and imagined perspective. *Abstracts of the 50th Annual Meeting of the Psychonomic Society* (p. 102), Boston, MA.
- Mettler, E. & Kellman, P. Adaptive sequencing in perceptual learning. (2009). *Abstracts of the 50th Annual Meeting of the Psychonomic Society* (p. 88), Boston, MA.
- Kellman, P.J. 3D and spatiotemporal object and surface formation. *AFOSR Workshop on Full-Cue Surface Representation in Mid-Level Vision*, San Francisco, CA, October, 2008.
- Clausner, T.C., Palmer, E.M. & Kellman, P.J. Conceptualization in language and its relation to perception. Paper presented at the *30th Annual Conference of the Cognitive Science Society*, Austin, TX, July, 2008.
- Son, J., Massey, C., Roth, Z., Longmire, W., Burke, T., Zucker, J. & Kellman, P. J. (2008). Perceptual learning in mathematics education. Poster presented at the *30th Annual Conference of the Cognitive Science Society*, Austin, TX, July, 2008.

- Massey, C.M., Kellman, P.J., Roth, Z., Burke, T., Longmire, W. & Son, J. Perceptual learning in mathematics education. Poster presented at the *Institute of Educational Sciences Investigators Annual Meeting*, Washington, D.C., June, 2008.
- Hilger, J.D. & Kellman, P.J. Misalignment constraints on visual interpolation, *8th Annual Meeting of the Vision Sciences Society*, Naples, FL, May, 2008.
- Unuma, H., Hasegawa, H. & Kellman, P.J. Contour and surface integration behind moving occluder, *8th Annual Meeting of the Vision Sciences Society*, Naples, FL, May, 2008.
- Mettler, E., Keane, B. & Kellman, P.J. Contour interpolation affects multiple object tracking, *8th Annual Meeting of the Vision Sciences Society*, Naples, FL, May, 2008.
- Keane, B., Lu, H. & Kellman, P.J. Contour interpolation and lightness induction mechanisms interact to produce classification image features in a shape discrimination task, *8th Annual Meeting of the Vision Sciences Society*, Naples, FL, May, 2008.
- Palmer, E., Clausner, T. & Kellman, P.J. Visual search in air traffic control: Altitude correlated depth cues enhance conflict detection, *8th Annual Meeting of the Vision Sciences Society*, Naples, FL, May, 2008.
- Kellman, P.J. A computational Gestalt agenda for perception and learning. Invited address, *2nd Annual Meeting of the Configural Processing Consortium*, Long Beach, CA, November, 2007.
- Kellman, P.J., Zucker, J. & Massey, C.M. Dynamic sequencing in computer-based learning technology: Optimizing efficiency for item memory and perceptual learning. *American Psychological Association 2007 Annual Convention*, San Francisco, CA, August, 2007.
- Kellman, P.J., Massey, C.M., Roth, Z., Burke, T., Zucker, J., Carpenter, D. & Mettler, E. Integrating conceptual foundations in mathematics. Poster presented at the *Institute of Educational Sciences Investigators Annual Meeting*, Washington, D.C., June, 2007.
- Kellman, P.J. Abstract relations in perception and perceptual learning. Invited Address, *11th International Conference on Cognitive and Neural Systems (ICCN)*, Boston, MA, May, 2007.
- Keane, B., Lu, H. & Kellman, P.J. Classification images of spatiotemporal illusory figures: Interpretations and implications. Symposium presentation in "Classification Imaging in Vision Research," *7th Annual Meeting of the Vision Sciences Society*, Sarasota, FL, May, 2007.
- Keane, B., Kellman, P.J. & Elwell, C. Classification images reveal differences between spatial and spatiotemporal contour interpolation. Poster presented at the *7th Annual Meeting of the Vision Sciences Society*, Sarasota, FL, May, 2007.
- Unuma, H., Hasegawa, H. & Kellman, P.J. (2007). Spatiotemporal interpolation behind moving occluder. Poster presented at the *7th Annual Meeting of the Vision Sciences Society*, Sarasota, FL, May, 2007.
- Mettler, E. & Kellman, P.J. Unconscious discovery in concrete and abstract perceptual learning. Paper presented at the *47th Annual Meeting of the Psychonomic Society*, Houston, TX, Nov., 2006.
- Kellman, P.J. Abstract relations in perception and perceptual learning. *Annual Meeting of the Configural Processing Consortium*, Houston, TX, November, 2006.
- Hilger, J.D., Fantoni, C., Gerbino, W. & Kellman, P.J. Surface interpolation and slant anisotropy. Poster presented at the *6th Annual Meeting of the Vision Sciences Society*, Sarasota, FL, May, 2006.
- Keane, B.P. & Kellman, P.J. Classification images reveal interpolation in dynamic displays. Poster presented at the *6th Annual Meeting of the Vision Sciences Society*, Sarasota, FL, May, 2006.
- Unuma, H., Hasegawa, H. & Kellman, P.J. Spatiotemporal contour interpolation and shape

- discrimination. Poster presented at the *6th Annual Meeting of the Vision Sciences Society*, Sarasota, FL, May, 2006.
- Fantoni, C., Gerbino, W. & Kellman, P. Amodal unification of surfaces with torsion requires visual approximation. *Paper presented at the 2005 European Conference on Visual Perception*, August, 2005.
- Garrigan, P. & Kellman, P.J. Contour shape effects on search performance: Evidence for constant curvature coding. Poster presented at the *5th Annual Meeting of the Vision Sciences Society*, Sarasota, FL, May, 2005.
- Kalar, D.J., Garrigan, P. & Kellman, P.J. Second-order contour discontinuities in segmentation and shape representation. Poster presented at the *5th Annual Meeting of the Vision Sciences Society*, Sarasota, FL, May, 2005.
- Fantoni, C., Hilger, J.D., Gerbino, W. & Kellman, P.J. Surface interpolation and 3D relatability. Poster presented at the *5th Annual Meeting of the Vision Sciences Society*, Sarasota, FL, May, 2005.
- Hilger, J.D. & Kellman, P.J. (2005). Tolerance for misalignment in contour interpolation: retinal or relational? Poster presented at the *5th Annual Meeting of the Vision Sciences Society*, Sarasota, FL, May, 2005.
- Kellman, P. & Massey, C. Perceptual learning techniques in middle and high school mathematics. Poster presented at the *Annual Meeting of Principal Investigators in the Division of Research and Evaluation*, Education and Human Resources Directorate, National Science Foundation, Washington, D.C., October, 2004.
- Kellman, P. & Garrigan, P. Is perceptual learning constrained to operate through perceptual (not sensory) representations? Poster presented at the *4th Annual Meeting of the Vision Sciences Society*, Sarasota, FL, May, 2004.
- Fantoni, C., Gerbino, W., & Kellman, P. Approximation, torsion, and amodally-unified surfaces. Poster presented at the *4th Annual Meeting of the Vision Sciences Society*, Sarasota, FL, May, 2004.
- Hass, R.W., Shipley, T.F., & Kellman, P.J. Decrease in illusory contour completion with retinal eccentricity is not due to loss of phase information. Poster presented at the *4th Annual Meeting of the Vision Sciences Society*, Sarasota, FL, May, 2004.
- Kalar, D.J., Garrigan, P., Kellman, P., & Wickens, T.D. A unified operator for contour interpolation. Poster presented at the *4th Annual Meeting of the Vision Sciences Society*, Sarasota, FL, May, 2004.
- Kellman, P.J., Garrigan, P., Kalar, D. & Shipley, T.F. Good continuation and relatability: Related but distinct principles of perceptual organization. Paper presented at the *Third Annual Meeting of the Vision Sciences Society*, Sarasota, FL, May, 2003.
- Garrigan, P. & Kellman, P.J. Perceptual learning uses interpreted perceptual representations. Paper presented at the 11th Annual Workshop on Object Perception and Memory (OPAM), Vancouver, BC, November, 2003.
- Kellman, P. Perceiving and learning about structure. APA 2003 Mentor Award Symposium: A Tribute to Rochel Gelman, *American Psychological Association 2003 Convention*, Toronto, August, 2003.
- Kellman, P.J. Perceptual processes that create objects from fragments. Invited symposium presentation, *International Joint Conference on Neural Networks*, Portland, OR, July, 2003.
- Kellman, P.J., Garrigan, P., Kalar, D. & Shipley, T.F. Good continuation and relatability: Related but distinct principles of perceptual organization. Paper presented at the *Third Annual Meeting of the Vision Sciences Society*, Sarasota, FL, May, 2003.

- Shipley, T.F. & Kellman, P.J. Retinal anisotropies in illusory contour formation. Poster presented at the *Third Annual Meeting of the Vision Sciences Society*, Sarasota, FL, May, 2003.
- Palmer, E. & Kellman, P.J. (Mis)Perception of motion and form after occlusion: Anorthoscopic perception revisited. Poster presented at the *Third Annual Meeting of the Vision Sciences Society*, Sarasota, FL, May, 2003.
- Guttman, S.E., Kellman, P.J. & Sekuler, A.B. Temporal variations in visual completion: A reflection of spatial limits? Poster presented at the *Third Annual Meeting of the Vision Sciences Society*, Sarasota, FL, May, 2003.
- Palmer, E. & Kellman, P.J. Underestimation of velocity after occlusion causes the aperture-capture illusion. Poster presented at the *Second Annual Meeting of the Vision Sciences Society*, Sarasota, FL, May, 2002.
- Garrigan, P. & Kellman, P.J. Three-dimensional contour interpolation: Testing the 90-degree constraint. Poster presented at the *Second Annual Meeting of the Vision Sciences Society*, Sarasota, FL, May, 2002.
- Guttman, S.E. & Kellman, P.J. Do spatial factors influence the microgenesis of illusory contours? Poster presented at the *Second Annual Meeting of the Vision Sciences Society*, Sarasota, FL, May, 2002.
- Cook, R., Mockrin, M., Blaisdell, A. & Kellman, P. Structure from motion effects in pigeons. *International Conference On Comparative Cognition*, Melbourne Beach, FL, March, 2002
- Kellman, P.J. Integration and interpolation in the visual perception of objects. Invited lecture, *6th International Conference on Cognitive and Neural Sciences*, Boston University, 2002
- Palmer, E. & Kellman, P.J. (2001). The aperture capture effect: Misperceived forms in dynamic occlusion displays. Paper presented at the *First Annual Meeting of the Vision Sciences Society*, Sarasota, FL, May, 2001.
- Guttman, S.E. & Kellman, P.J. (2001). Contour interpolation: necessary but not sufficient for the perception of interpolated contours. Paper presented at the First Annual Meeting of the Vision Sciences Society, Sarasota, FL, May, 2001.
- Choplin, J., Huttenlocher, J. & Kellman, P.J. Perceptual discrimination and memory. Paper presented at the First Annual Meeting of the Vision Sciences Society, Sarasota, FL, May, 2001.
- Kellman, P.J. Object perception from information that is fragmentary across space and time: A theoretical overview. Invited symposium presentation, *24th International Congress of Psychology*, Stockholm, Sweden, July, 2000.
- Kellman, P.J. Four dimensions and three levels in models of object perception. Invited symposium presentation, *31st Carnegie-Mellon Symposium on Cognition*, June, 2000.
- Kellman, P.J., Burke, T. & Hummel, J. Modelling the discovery of abstract invariants. *7th Annual Workshop on Object Perception and Memory (OPAM)*, Los Angeles, CA, Nov., 1999.
- Kellman, P.J. Understanding and creating expertise through perceptual learning. Invited lecture, *NSF Symposium on Technology in Undergraduate Education*, July, 1999.
- Kellman, P. J. Visual grouping in three dimensions. Invited symposium presentation, *Association for Research in Vision and Ophthalmology Annual Meeting*, Ft. Lauderdale, FL, May, 1999.
- Silva, A. B. & Kellman, P.J. Perceptual learning in mathematics: The algebra-geometry connection. Poster presented at *NSF LIS Investigators Conference*, Washington, D.C., April, 1999.
- Kubose, T., Kellman, P.J., Gelman, R. & Wise, J. Perceptual learning in mathematics: Mapping across multiple representations. Poster presented at *NSF LIS Investigators Conference*, Washington, D.C., April, 1999.

- Russell, A. & Kellman, P.J. Perceptual learning in chemistry. Poster presented at *NSF LIS Investigators Conference*, Washington, D.C., April, 1999.
- Russell, A. & Kellman, P.J. What difference does it make? Assessing the effects of the molecular science project learning strategies. *218th American Chemical Society National Meeting*, New Orleans, LA: August, 1999.
- Kellman, P.J., Stratechuk, T. & Hampton, S. Training pilots' pattern recognition skills: Perceptual learning modules (PLMs) in instrument flight training. *Second Annual Embry-Riddle Aeronautical University Flight Instructor Conference*, Daytona Beach, FL, April, 1999.
- Cook, R. & Kellman, P.J. Object perception in humans and avians. Invited lecture, *American Psychological Association Annual Convention*, San Francisco, CA, August, 1998.
- Kellman, P.J. How the world gets to the mind: Constraints and processes in visual object perception. *Center for Visual Science Symposium*, University of Rochester, June, 1998.
- Russell, A.A. & Kellman, P.J. Teaching automatic, 3-D recognition of chemical structures, *American Chemical Society Meeting*, Dallas, Texas, March, 1998.
- Palmer, E., Kellman, P. J. & Shipley, T.F. Effects of velocity in dynamic object completion. Paper presented at the *Annual Meeting of the Association for Research in Vision and Ophthalmology*, Ft. Lauderdale, FL, April, 1998.
- Kellman, P.J. Perceptual learning and expertise. Paper presented at the *Second International Conference on Human Performance*. Temecula, CA, March, 1998.
- Yin, C., Kellman, P.J. & Shipley, T.F. Surface and edge interactions in the perception of partly occluded objects. Poster presented at the *38th Annual Meeting of the Psychonomic Society*, Philadelphia, PA, November, 1997.
- Kellman, P.J., Yin, C. & Shipley, T.F. 3-D relatability determines 3-D object completion. Paper presented at the *38th Annual Meeting of the Psychonomic Society*, Philadelphia, PA, November, 1997.
- Cunningham, D.W., Shipley, T.F. & Kellman, P.J. The roles of spatial and spatiotemporal surface information in spatiotemporal boundary formation. Poster presented at the *Annual Meeting of the Association for Research in Vision and Ophthalmology*, Ft. Lauderdale, FL, April, 1997.
- Palmer, E., Kellman, P. J. & Shipley, T.F. Spatiotemporal relatability in dynamic object completion. Paper presented at the *Annual Meeting of the Association for Research in Vision and Ophthalmology*, Ft. Lauderdale, FL, April, 1997.
- Kellman, P.J., Shipley, T.F. & Kim, J. Global and local effects in object completion: Evidence from a boundary localization paradigm. Paper presented at the *37th Annual Meeting of the Psychonomic Society*, St. Louis, MO, November, 1996.
- Kellman, P.J. Visual perception of objects and boundaries: A 4-dimensional approach. Invited lecture, *Hans-Lukas Teuber Memorial Symposium*, Massachusetts Institute of Technology, October, 1996.
- Kellman, P.J. Boundary and surface completion in visual object perception. Invited lecture, Image Segmentation Symposium, *1996 Meeting of the Optical Society of America*, Rochester, NY, October, 1996.
- Kellman, P.J. & Shipley, T.F. Depth and motion in object completion. Paper presented at the *European Conference on Visual Perception*, Strasbourg, France, September, 1996.
- Kellman, P.J. An update on Gestalt Psychology. Invited lecture, *Gleitman Festschrift*, University of Pennsylvania, June, 1996.

- Kellman, P.J. The third and fourth dimensions in object perception: Some considerations for next-generation models. Invited lecture, *NEC Institute Summer Symposium*, Princeton, NJ, June, 1996.
- Yin, C., Kellman, P.J. & Shipley, T.F. Surface completion: Evidence from a depth discrimination paradigm. Poster presented at the *Annual Meeting of the Association for Research in Vision and Ophthalmology*, Ft. Lauderdale, FL, April, 1996.
- Cunningham, D.W., Shipley, T.F. & Kellman, P.J. Spatiotemporal boundary formation: The role of global motion signals. Paper presented at the *Annual Meeting of the Association for Research in Vision and Ophthalmology*, Ft. Lauderdale, FL, April, 1996.
- Kellman, P.J., Machado, L., Shipley, T.F. & Li, C.C. 3-D determinants of object completion. Paper presented at the *Annual Meeting of the Association for Research in Vision and Ophthalmology*, April, 1996.
- Shipley, T.F., Cunningham, D.W. & Kellman, P.J. Perceptual boundary completion: Interpolation of extrapolation? Paper presented at the *36th Annual Meeting of the Psychonomic Society*, Los Angeles, CA, November, 1995.
- Yin, C. & Kellman, P.J. Probing representations of occluded surfaces with a bistable apparent motion paradigm. Poster presented at the *36th Annual Meeting of the Psychonomic Society*, Los Angeles, CA, November, 1995.
- Mather, R., Sinha, S., Sinha, U., Hall, T., Kellman, P.J. & Kangaroo, H. Interactive teaching module integrated with picture archiving and communication systems (PACS), radiology information systems (RIS) and hospital information systems (HIS). Paper presented at the *81st Annual Meeting of the Radiological Society of North America*, November, 1995.
- Mather, R., Sinha, S., Sinha, U., Hall, T., Kellman, P.J. & Kangaroo, H. Development of perceptual skills in the differential diagnosis of congenital heart disease from chest radiographs using an interactive teaching module. Poster presented at the *81st Annual Meeting of the Radiological Society of North America*, November, 1995.
- Yin, C., Kellman, P.J. & Shipley, T.F. A surface spreading process complements boundary interpolation under occlusion. Paper presented at the *Annual Meeting of the Association for Research in Vision and Ophthalmology*, 1995.
- Kellman, P.J., Yin, C. & Shipley, T.F. A common mechanism for illusory and occluded figure completion: Evidence from hybrid displays. Paper presented at the *Annual Meeting of the Association for Research in Vision and Ophthalmology*, 1995.
- Shipley, T.F., Cunningham, D.W. & Kellman, P.J. Perception of stability in dynamic scenes. Paper presented at the *35th Annual Meeting of the Psychonomic Society*, Washington, D.C., November, 1994.
- Kellman, P.J. & Kaiser, M.K. Perceptual learning modules in flight training. Paper presented at the *Annual Meeting of the Human Factors and Ergonomics Society*, Nashville, TN, October, 1994.
- Shipley, T.F. & Kellman, P.J. Spatiotemporal boundary formation: Evidence for recovery of shape and motion from local motion signals. Poster presented at the *Annual Meeting of the Association for Research in Vision and Ophthalmology*, 1994.
- McBeath, M. & Kellman, P.J. Optimal defensive positioning to limit basketball shooting accuracy. Paper presented at the *34th Annual Meeting of the Psychonomic Society*, Washington, D.C., November, 1993.
- Shipley, T.F. & Kellman, P.J. Competition and cooperation in spatiotemporal boundary formation. Paper presented at the *34th Annual Meeting of the Psychonomic Society*, Washington, D.C., November, 1993.

- Shipley, T., Cunningham, D. & Kellman, P.J. Spatiotemporal stereopsis. Paper presented at the *7th International Conference on Event Perception & Action*, Vancouver, British Columbia, Canada, August, 1993.
- Kellman, P.J. Perceiving objects across gaps in space and time. Invited presentation, *Conference on Object Representation in Visual and Haptic Systems*, Madrid, Spain, May, 1993.
- Shipley, T.F. & Kellman, P.J. Spatiotemporal boundary formation: Temporal integration occurs within a fixed 150 msec window. Poster presented at the *Annual Meeting of the Association for Research in Vision and Ophthalmology*, April, 1993.
- Monterosso, J., Kellman, P.J. & Shipley, T.F. 3-D determinants of object perception under occlusion. Paper presented at the *33rd Annual Meeting of the Psychonomic Society*, St. Louis, November, 1992.
- Shipley, T.F. & Kellman, P.J. Spatiotemporal boundary formation: Evidence for a fixed temporal window for information integration. Paper presented at the *33rd Annual Meeting of the Psychonomic Society*, St. Louis, November, 1992.
- Shipley, T.F. & Kellman, P.J. Constraints on spatiotemporal boundary formation. Paper presented at the annual meeting of the *Association for Research in Vision and Ophthalmology*, 1992.
- Kaiser, M.K., Kellman, P.J., Banks, M.S. & Aiken, W. Perception of target motion by passively moving observers. Paper presented at the *33rd Annual Meeting of the Psychonomic Society*, St. Louis, November, 1992.
- Vishton, P., Kellman, P.J. & Shipley, T.F. Scene perception under dynamic occlusion. Paper presented at the *32nd Annual Meeting of the Psychonomic Society*, San Francisco, CA, November, 1991.
- Shipley, T.F. & Kellman, P.J. Spatiotemporal boundary formation. Paper presented at the *Annual Meeting of the Association for Research in Vision and Ophthalmology*, May, 1991.
- Shipley, T.F. & Kellman, P.J. Spatiotemporal interpolation in object perception: Some new phenomena. Paper presented at the *31st Annual Meeting of the Psychonomic Society*, New Orleans, LA, November, 1990.
- Shipley, T.F. & Kellman, P.J. Perception of partly occluded objects and subjective figures: Evidence for a common process. Paper presented at the *Annual Meeting of the Association for Research in Vision and Ophthalmology*, 1990.
- Kellman, P.J., VandeWalle, G., von Hofsten, C. & Condry, K. Perception of motion and stability during observer motion by pre-stereoscopic infants. Paper presented at the *7th International Conference on Infant Studies*, Montreal, Canada, April, 1990.
- Kellman, P.J. & Shipley, T.F. Visual interpolation in the third and fourth dimensions. Paper presented at the *30th Annual Meeting of the Psychonomic Society*, Atlanta, Georgia, November, 1989.
- Kellman, P. Perceiving motion and stability in infancy. Invited paper, *Fifth International Conference on Event Perception and Action*, Miami, Ohio, July, 1989.
- Kellman, P., Power, L. & Shipley, T.F. Visual interpolation in object perception: Evidence from a kinematic occlusion paradigm. Paper presented at the *Fifth International Conference on Event Perception and Action*, Miami, Ohio, July, 1989.
- Kellman, P. Kinematic foundations of infant visual perception. Invited paper, *1989 Carnegie-Mellon Symposium on Cognition*, Pittsburgh, Pennsylvania, June, 1989.
- Shipley, T.F. & Kellman, P.J. Discontinuity theory and the perception of illusory figures. Paper presented at the *29th Annual Meeting of the Psychonomic Society*, Chicago, November, 1988.

- Kellman, P.J. & Shipley, T.F. Interpolation processes in visual object perception: Evidence for a discontinuity theory. Paper presented at the *28th Annual Meeting of the Psychonomic Society*, Seattle, November, 1987.
- Kellman, P.J. Objects, motion and stability in the world of the (moving) infant. Symposium presentation, *Biennial Meeting of the Society for Research in Child Development*, Baltimore, April, 1987.
- Kellman, P.J. Seeing behind and between: Interpolation processes in the visual perception of objects. Invited presentation, *1986 Cornell Symposium on Induction in Perception and Cognition*, Ithaca, NY, August, 1986.
- Kellman, P.J. & Short, K.R. The more things change, the more they stay the same: Infant perception of three-dimensional form from optical changes given by observer movement. Paper presented at the *Fifth Biennial International Conference on Infant Studies*, Los Angeles, California, April, 1986.
- Kellman, P.J. & Loukides, M.G. Configuration and brightness as causal factors in subjective contours: Two direct tests. Invited presentation at the *1985 Adelphi Conference on Illusory Contours*, Garden City, New York, November, 1985.
- Kellman, P.J. & Loukides, M.G. Approaching the edge: An object perception analysis of static and kinetic subjective contours. Invited presentation at the *1985 Adelphi Conference on Illusory Contours*, Garden City, New York, November, 1985.
- Kellman, P.J. Theories of perception and research in perceptual development. Invited discussion, *20th Minnesota Symposium on Child Psychology*, Minneapolis, Minnesota, October, 1985.
- Kellman, P.J., von Hofsten, C. & Soares, J. Principles of infant event perception: Concurrent motion as a specifier of translation in depth. Paper presented at the *Third International Conference on Event Perception and Action*, Uppsala, Sweden, June, 1985.
- Kellman, P., & Short, K.R. Infant perception of partly occluded objects: the problem of rotation. Paper presented at the *Third International Conference on Event Perception and Action*, Uppsala, Sweden, June, 1985.
- Kellman, P. J. An event perception approach to infant perception. Invited address, *Third International Conference on Event Perception and Action*, Uppsala, Sweden, June, 1985.
- Kellman, P.J., & Short, K.R. Infant form perception from perspective transformations. Paper presented at the *Biennial Meeting of the Society for Research in Child Development*, Toronto, Canada, April, 1985.
- Kellman, P.J., von Hofsten, C., & Soares, J. Concurrent motion in infant event perception. Paper presented at the *Biennial Meeting of the Society for Research in Child Development*, Toronto, Canada, April, 1985.
- Kellman, P. J. Kinetic subjective contours. Paper presented at the *Second International Conference on Event Perception*, Nashville, Tennessee, 1983.
- Kellman, P. J. Perception of three-dimensional form in infancy. Paper presented at the *Biennial Meeting of the Society for Research in Child Development*, Detroit, April, 1983.
- Kellman, P. J. & Spelke, E. S. Infants' perception of partly occluded objects: Sensitivity to movement and configuration. Paper presented at the *Biennial Meeting of the Society for Research in Child Development*, Boston, April, 1981.
- Kellman, P. J. & Spelke, E. S. Infants' perception of partly occluded objects. Paper presented at the *Biennial Meeting of the Society for Research in Child Development*, San Francisco, March, 1979.

Carter, D. E., Kellman, P. J. & Geraghty, J. A. Acquisition and transfer of symbolic hue oddity learning by pigeons. Paper presented at the *Annual Meeting of The American Psychological Association*, August 1978.

Carter, D. E., Geraghty, J. A., & Kellman, P. J. Is delayed matching performance by pigeons analogous to human short-term memory? Paper presented at the *Eastern Psychological Association Convention*, April, 1976.

OTHER INVITED LECTURES AND COLLOQUIA

Binghamton University, September, 2019

University of Iowa, February, 2019

Keynote Speaker, Gordon Conference on Scientific Visualization, Lewiston, ME, August, 2017.

Featured Scholar, Wisconsin Ideas in Education Series (WIES), University of Wisconsin-Madison, Center for Education Research, November, 2015.

Invited Symposium, Connecting learning, memory, and representation in math education. Annual Meeting of the Cognitive Science Society, Pasadena, CA, June, 2015.

Stanford University, Center for the Study of Language and Information (CSLI), Workshop on Cognitive Science and Mathematics Education, February, 2015.

Grand Rounds, UCLA David Geffen School of Medicine, Department of Surgery, July, 2015

Invited Symposium Speaker, Human mathematical abilities: From intuition to the classroom and back, 2015 AAAS Meeting, San Jose, CA, February, 2015.

Northwestern University, Department of Psychology, February, 2014

Technical University of Kaiserslautern, Kaiserslautern, Germany, Department of Psychology, August, 2013

University of Nevada, Reno, Department of Psychology, September, 2012

Delaware State Teacher of the Year Awards Ceremony, University of Delaware, April, 2012

University of Delaware, Learning Technology Group, April, 2012

Cognitive Science Seminar, University of California, San Diego, March, 2012

Second Annual Symposium on the Science of Learning in Medical Education, UCLA School of Medicine, October, 2010

Los Angeles Symposium on Educational Reform, sponsored by New Roads School System, October, 2010

Shape Processing Workshop, European Conference on Computer Vision (ECCV), Crete, Greece, September, 2010.

University of Nevada, Reno, Department of Psychology, September, 2012

University of Delaware, Learning Technology Group, April, 2012

Cognitive Science Seminar, University of California, San Diego, March, 2012

Second Annual Symposium on the Science of Learning in Medical Education, UCLA School of Medicine, October, 2010

Los Angeles Symposium on Educational Reform, sponsored by New Roads School System, October, 2010

Shape Processing Workshop, European Conference on Computer Vision (ECCV), Crete, Greece, September, 2010.

Association for Advancement of Artificial Intelligence (AAAI) Symposium on Cognitive
 Shape Processing, Stanford University, March, 2010
 Science Exchange Lecturer, The Marlborough School, Los Angeles, CA, Feb., 2010
 University of Pennsylvania, Institute for Research in Cognitive Science (IRCS), Dec., 2009
 California Institute of Technology, Cognition and Neural Systems Group, June, 2008
 Indiana University, Department of Psychology, March, 2008
 Purdue University, Department of Psychology, March, 2008
 Keynote address, Configural Processing Consortium, Long Beach, CA, 2007
 Eleventh International Conference on Cognitive and Neural Systems, Center for Cognitive
 and Neural Systems, Boston University, 2007
 Configural Processing Consortium, Houston, TX, 2006
 PSI CHI Distinguished Lecture, Georgetown University, Department of Psychology, 2005
 Irvin Rock Memorial Lecture, UC Berkeley, 2004
 International Joint Conference on Neural Networks, Portland, OR, 2003
 International Conference on Cognitive and Neural Systems, Center for Cognitive and
 Neural Systems, Boston University, 2002
 University of Chicago, Department of Psychology, October, 2000
 International Congress of Psychology, Stockholm, Sweden, July, 2000
 Office of Naval Research, MURI Kickoff Meeting, July, 2000
 31st Carnegie-Mellon Symposium on Cognition, June, 2000
 University of Arizona, Department of Psychology, January, 2000
 Keck Foundation Mathematics and Science Institute, Santa Monica, CA, December, 1999
 NSF Symposium on Technology in Undergraduate Education, July, 1999
 HRL Laboratories, Malibu, CA, November, 1998
 Electrical Power Research Institute (EPRI), Palo Alto, CA, August, 1998
 American Psychological Association Annual Convention, Board of Scientific Affairs, San
 Francisco, CA, August, 1998
 University of Rochester, Center for Visual Science (CVS) Symposium, June, 1998
 U. of Southern California, Symposium on Learning and Object Recognition, Feb., 1998
 NYU/NECI Symposium on Perceptual Learning and Development, February, 1998
 Merck & Co., Inc., Rahway, NJ, December, 1997
 California Institute of Technology, Cognition and Neural Systems, October, 1997
 University of California, San Diego, Department of Psychology, April, 1997
 University of Rochester, Center for Visual Science, February, 1997
 Georgetown University, Department of Psychology, February, 1997
 Massachusetts Institute of Technology, Hans Lukas Teuber Memorial Symposium, Oct., 1996
 Harvard University, Vision Sciences Group, October, 1996
 University of California, Santa Barbara, Department of Psychology, June 1996
 University of Pennsylvania, Gleitman Festschrift, June, 1996
 NEC Research Institute Symposium, Princeton, NJ, June, 1996