

# PHILIP J. KELLMAN

## Curriculum Vitae

University of California, Los Angeles  
Department of Psychology  
405 Hilgard Avenue  
Los Angeles, CA 90095-1563  
(310) 825-4159  
<Kellman@cognet.ucla.edu>

September, 2009

### EDUCATION

---

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

### POSITIONS

---

Chair, Cognitive Area, UCLA Department of Psychology, 2001-02; 2007 – present  
Professor of Psychology, University of California, Los Angeles, 1993 – present  
Professor Step VI, University of California, 2004 (Step VI is a special rank conferred in the UC system "upon evidence of great distinction, recognized nationally or internationally, in scholarly or creative achievement.")  
Director, UCLA Cognitive Science Research Program, 1993 – 2003  
Director, UCLA Human Perception Laboratory, 1993 - present  
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

---

Distinguished Teaching Award, UCLA Department of Psychology, 2008  
Finalist, 2<sup>nd</sup> International Best Visual Illusion of the Year Contest (with Evan Palmer), 2004  
Irvin Rock Memorial Lecturer, University of California, Berkeley, 2004  
Supervised dissertation by Evan M. Palmer, "Spatiotemporal relatability in the perception of dynamically occluded objects," winner of James McKeen Cattell Award (for "best dissertation in Psychology"), New York Academy of Sciences, 2004  
Wolf Aviation Prize (national award given annually by the Alfred and Constance Wolf Foundation for "best new idea benefitting aviation"; awarded for the idea of aviation perceptual learning modules (PLMs)), 1993

National Research Council Senior Associateship, 1991-92  
 Fulbright Senior Scholar Program, Research Award to Australia, 1987-88  
 James McKeen Cattell Fund Sabbatical Award, 1987-88  
 William Chase Memorial Award (award given biennially by Carnegie-Mellon University for "early career contributions in cognitive psychology"), 1987  
 Boyd R. McCandless Young Scientist Award (award given for "early career contributions in developmental psychology"), American Psychological Association, 1986  
 Graduate Fellowships and Awards: National Institute of Mental Health Predoctoral Fellowship, 1979-1980; Graduate Teaching Award, University of Pennsylvania, 1980; Dean's Fellowship, University of Pennsylvania, 1979-1980; Danforth Foundation Graduate Fellowship, 1976-1980

## RESEARCH GRANTS

---

### **Current:**

NIH Challenge Grant (2009-2011), "Perceptual and adaptive learning in chemistry education," PI; Co-PI: Arlene Russell, UCLA, 2009-2011.  
 National Institute of Justice (2010-2013), "Error rates for latent fingerprinting as a function of visual complexity and cognitive difficulty," Co-PI; PI: J. Mnookin.  
 US Army RDECOM (2009-2010), "Adaptive computer-assisted (ACAT) technology for optimal sick call performance," Co-PI; PI: C. Hein.  
 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" PI: P. Kellman; Co-PI: C. Massey (University of Pennsylvania).  
 UCLA Medical School, Center for Advanced Surgical and Interventional Technology (CASIT), (2009-2011), "Perceptual and adaptive learning technology in medical training," PI.  
 UCLA Behavioral Neurosciences Training Grant (2000 - present), Co-Investigator.

### **Selected Earlier Grants and Contracts:**

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).  
 Keck Foundation Vision Sciences Grant (2005-2006), Co-Investigator  
 National Eye Institute EY13518 (2001-2005), "Spatial and Temporal Integration in Visual Object Perception," PI: P. Kellman; Co-PI: Thomas F. Shipley (Temple University).  
 Office of Naval Research Multi-University Research Initiative (2001 - 2005), "Integrated decision technology -- Combining and Optimizing Expert Systems, Interfaces and Training." PIs: J. Pearl, A. Darwiche (UCLA Dept. of Computer Science). Co-PIs: R. Dechter, S. Irani, D. Roth, P. Kellman.  
 NASA Human-Centered Computing Program NRA2-37143, "Multi-media Human-Computer Interfaces for Mission-critical Systems," (collaborative with NASA/CalTech Jet Propulsion Laboratory). PI: W. Karplus, 2001-2002; P. Kellman, 2002-2004.

- HRL Laboratories (2000-2002), "Human Factors Analysis of Air Traffic Control Displays and Controller Performance", PI.
- NSF Learning and Intelligent Systems (LIS) Program (1997-2001), "Learning in Complex Environments by Natural and Artificial Systems," Co-PI, 1997-1999; PI, 2000-2001
- NSF SBR- 9496112 (1993-1998): "Spatial and Temporal Interpolation in Visual Object Perception," PI.
- UCLA Developmental Cognitive Science Training Grant, Co-PI, 1997-2000
- Embry-Riddle Aeronautical University Contract (1997-1999), "Perceptual Learning Modules for Instrument Flight Training," PI.
- Hughes Research Laboratories (1998-1999), "Human Factors Analysis of Air Traffic Control Displays and Controller Performance," PI.
- NSF Research Experiences for Undergraduates (REU), 1989, 1991, 1993, 1994, 1996
- NSF BNS 91-20969 (1992-1993): "Spatial and Temporal Interpolation in Object Perception," PI.
- Lang Faculty Fellowship, Swarthmore College, 1991-92, 1987-88, 1983-84.
- NSF BNS 89-13707 (1990-91): "Spatial and Temporal Interpolation in Visual Object Perception," PI.
- Sloan Foundation Summer Grant for Technology in the Liberal Arts (1990), "Flight Simulation in Aeronautics and Human Factors Psychology Courses," PI.
- NSF BNS 85-19851 (1986-89): "Perceptual Kinematics of Object and Space Perception in Infancy," PI.
- NSF INT 83-15436 (1984): "Infant Visual perception of Unity, Form and Events," PI.
- NSF BNS 82-10110 (1982-84): "The Kinetics of Unity and Form Perception in Infancy," PI.

### **PROFESSIONAL AFFILIATIONS**

---

Vision Sciences Society  
 The Psychonomic Society  
 Cognitive Science Society  
 Configural Processing Consortium  
 Association for Research in Vision and Ophthalmology  
 Association for Psychological Science  
 Aerospace Medical Association  
 Aircraft Owners and Pilots Association  
 Society for Research in Child Development  
 Human Factors and Ergonomics Society

### **SELECTED OTHER PROFESSIONAL ACTIVITIES**

---

Chair, 2007, Configural Processing Consortium (CPC) Annual Meeting  
 Program Review Board, Vision Sciences Society, 2000 - present  
 Program Reviewer, U.S. Dept. of Energy, 2008  
 Founder and President, *Insight Learning Technology, Inc.*  
 Program Committee, Cognitive Science Society, 2000  
 Member, 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, Cognitive Area, 2001 – 2002, 2007-present; 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

Session Chair, Meetings of: Association for Research in Vision and Ophthalmology (ARVO), European Conference on Visual Perception (ECVP), The Psychonomic Society, Society for Research in Child Development (SRCD), Jean Piaget Society

Grant reviewer for NASA, NSF, NIH, NIMH, Australian National Research Council

Reviewer for numerous journals, including: *Science*, *Psychological Review*, *Journal of Vision*, *Journal of Experimental Psychology: General*, *Journal of Experimental Psychology: Human Perception & Performance*, *Vision Research*, *Journal of the Optical Society of America A*, *Perception*, *Proceedings of the National Academy of Sciences*, *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*

## PUBLICATIONS

---

### **Books**

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**

- Massey, C.M., Kellman, P.J., Roth, Z. & Burke, T. (in press). 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*.
- Kalar, D., Garrigan, P., Hilger, J., Wickens, T. & Kellman, P. (in press). A unified model for contour interpolation. *Vision Research*.
- Palmer, E.M., Clausner, T. & Kellman, P.J. (in press). Perceptual cues and imagined viewpoints modulate visual search in air traffic control displays, *Human Factors*.
- Kellman, P.J., Massey, C.M & Son, J. (accepted pending revision). Perceptual learning modules in mathematics: Enhancing students' pattern recognition, structure extraction, and fluency. *Topics in Cognitive Science*, special issue on perceptual learning.
- Kellman, P.J. & Garrigan, P.B. (2009). Perceptual learning and human expertise. *Physics of Life Reviews*, Vol. 6, No. 2, 53-84.
- 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.
- 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.
- 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., Stratechuk, T. & Hampton, S. (1999). Training pilots' pattern recognition skills: Perceptual learning modules (PLMs) in instrument flight training. In Wiggins, M. (Ed.) *Proceedings of the 2<sup>nd</sup> 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**

- Kellman, P.J., Garrigan, P., Palmer, E.M. (in press). 3-D and spatiotemporal interpolation in object and surface formation. In C. Tyler & J. Zhang (Eds.) *Computational 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**

- 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.

- 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 30<sup>th</sup> Annual Conference of the Cognitive Science Society* (p. 197). Austin, TX: Cognitive Science Society.
- 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 30<sup>th</sup> 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/>
- 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 4/06.)
- System and Method for Perceptual Learning*. Inventor: P. Kellman (pending).

## PRESENTATIONS AT PROFESSIONAL MEETINGS

---

- 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, 2008.
- 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.
- Keane, B., Lu, H. & Kellman, P.J. Filled-in regions influence real and interpolated shape via lightness induction, *9th Annual Meeting of the Vision Sciences Society*, Naples, FL, May, 2008.
- 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 *30<sup>th</sup> 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 *30<sup>th</sup> 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, *2<sup>nd</sup> 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, *11<sup>th</sup> International Conference on Cognitive and Neural Systems (ICCNS)*, 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 *47<sup>th</sup> Annual Meeting of the Psychonomic Society*, Houston, TX, November, 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 11<sup>th</sup> 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, *31<sup>st</sup> 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 reliability 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 reliability 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.

#### **SELECTED INVITED LECTURES AND COLLOQUIA**

---

- 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  
University of Southern California, Symposium on Learning and Object Recognition, February, 1998  
NYU/NECI Symposium on Perceptual Learning and Development, February, 1998  
Merck & Co., Inc., Rahway, NJ, December, 1997  
California Institute of Technology, Cognitive 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, October, 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