George Sperling

- Publications
- Reprintings of Publications
- Unpublished Bell Laboratories Technical Memoranda
- Talks at Conferences and Meetings of Professional Societies
- Invited Lectures at Universities and Institutes
Publications (including Published Abstracts)


†HIPS is the Human Information Processing Laboratory’s Image Processing System.


†HIPS is the Human Information Processing Laboratory’s Image Processing System.


<table>
<thead>
<tr>
<th>Year</th>
<th>Authors</th>
<th>Title</th>
<th>Journal</th>
<th>Volume</th>
<th>Issue</th>
<th>Pages</th>
<th>Abstract/DOI</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>Sperling, G., Sun, P., Wright, C. E. &amp; Chubb, C.</td>
<td>An automatic, bottom-up process segregates homogeneous elements from similar but different elements in a brief visual display.</td>
<td><em>Perception</em></td>
<td>42</td>
<td>Suppl.</td>
<td>15</td>
<td>[Abstract]</td>
</tr>
<tr>
<td>2015</td>
<td>Sun, P., Chubb, C., &amp; Sperling, G.</td>
<td>Two mechanisms that determine the Barber-Pole Illusion.</td>
<td>Vision Research</td>
<td>111A</td>
<td></td>
<td>43-54</td>
<td></td>
</tr>
</tbody>
</table>


Reprintings of Publications

(A partial list of books in which the articles, whose journal references were given above, have been reprinted. Not up to date.)

* Indicates the entire volume of the journal was reprinted.

The information available in brief visual presentations (1960).


Short-term storage of information in vision (1961).


Linear theory and the psychophysics of flicker (1964).

Successive approximations to a model for short-term memory (1967).


3a. Translated into Italian by Franco Angeli Editori, Milan, Italy, 1970.


Computer Papers


Sperling/Landy/Cohen/Pavel, Intelligible encoding of ASL image sequences at extremely low information rates.


Bell Labs Technical Memoranda


Talks at Conferences and Meetings of Professional Societies

† Indicates an invited address.
‡ Indicates a plenary address.
* Indicates an abstract of talk was published.
Unless otherwise noted, items indicate talks given by George Sperling

1962 †Symposium on Memory (Sponsored by the Office of Naval Research), Austin, Texas, January 25, 1962. Two Kinds of Human Memory.
1962 †Symposium on Information Processing in Man: Research Frontiers (Sponsored jointly by the Human Factors Society and the University of Southern California), Los Angeles, California, June 23, 1962. A Model for Visual Memory Tasks.


1968 †Mathematical Psychology Meetings. Stanford University, Palo Alto, California, August 29, 1968. *Structural Considerations in Models of Memory. (Incorporated into Group Discussion).


George Sperling - 25 . Conference Talks - 3


1970 †Symposium on Memory, Experimental Psychology Society (Great Britain), National Hospital, Queens Square, London, January 3, 1970. Structural Factors in Memory.


1970 †Workshop on Processing Models in Perception and Psychophysics, Miami Beach, Florida, August 26, 1970. (Sponsored by the National Science Foundation, the Mathematical Social Science Board, and the Center for Advanced Study in the Behavioral Sciences.) Elementary Neural Models for Perceptual Phenomena.


<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
<th>Venue</th>
<th>Location</th>
<th>Presentation Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1972</td>
<td>‡Sperling, George. Twentieth International Congress of Psychology</td>
<td>Tokyo, Japan</td>
<td>Japan</td>
<td>Visual Masking</td>
</tr>
<tr>
<td>1972</td>
<td>‡Sperling, George. American Psychological Association</td>
<td>Honolulu, Hawaii, Division 3 (Experimental Psychology)</td>
<td>Hawaii</td>
<td>Visual Search</td>
</tr>
<tr>
<td>1973</td>
<td>‡Sperling, George. The Margaret E. Tresselt Memorial Conference</td>
<td>New York University</td>
<td>New York</td>
<td>The Search for the Highest Rate of Search</td>
</tr>
<tr>
<td>1973</td>
<td>‡Sperling, George. Symposium on Attention and Performance-V.</td>
<td>Saltsjöbaden, Stockholm, Sweden</td>
<td>Sweden</td>
<td>Limits on the Spatial Range of Attention</td>
</tr>
<tr>
<td>1973</td>
<td>‡Sperling, George. Mathematical Psychology Meeting</td>
<td>University of Montreal, Quebec, Canada</td>
<td>Canada</td>
<td>Estimating Item and Order Information</td>
</tr>
<tr>
<td>1976</td>
<td>‡Sperling, George. International School of Biophysics.</td>
<td>Erice-Trapani, Sicily, Italy</td>
<td>Italy</td>
<td>Integration of Sensory Information</td>
</tr>
<tr>
<td>1976</td>
<td>‡Workshop in the Theory and Measurement of Economic Choice Behavior</td>
<td>Berkeley, California</td>
<td>California</td>
<td>Two Models for Economics from Psychology</td>
</tr>
<tr>
<td>1976</td>
<td>‡With Melvin J. Melchner, talk presented by George Sperling.</td>
<td>Abbaye de Senanque, Gordes, France</td>
<td>France</td>
<td>Attention Operating Characteristics for Visual Search</td>
</tr>
<tr>
<td>1976</td>
<td>‡Ninth Annual Mathematical Psychology Meeting</td>
<td>New York University</td>
<td>New York, NY</td>
<td>Attention Operating Characteristics for Visual Search</td>
</tr>
<tr>
<td>1976</td>
<td>With Adam Reeves, talk presented by George Sperling.</td>
<td>Saint Louis, Missouri</td>
<td>Missouri</td>
<td>Reaction Time of an Unobservable Response</td>
</tr>
</tbody>
</table>


†HIPS is the Human Information Processing Laboratory’s Image Processing System.


   June 24, 1985: *The Role of Time and Distance in Apparent Motion.


1988  †Sperling, George. Visual Form and Motion Perception: Psychophysics, Computation, and Neural Networks. (Meeting dedicated to the memory of the late Kvetoslav Prazdny.) Boston University, Massachusetts. Fourier and Non-Fourier Perception of Motion and Orientation. Saturday, March 5, 1988.


1990 †Sperling, George. Sigraph Conference, Pace University, New York, NY, October 14, 1990 Perceptual Basis of Three-Dimensional Vision


<table>
<thead>
<tr>
<th>Year</th>
<th>Authors</th>
<th>Conference/Event</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>Sperling, G.</td>
<td>†Symposium to Honor R. Duncan Luce, University of California, Irvine, California. August 2, 1995</td>
<td>Quantal versus Continuous Dynamics of Spatial Attention</td>
</tr>
<tr>
<td>1995</td>
<td>Sperling, G.</td>
<td>†European Mathematical Psychology Meeting, Regensberg, Germany, Luce Symposium, September 5, 1995</td>
<td>Deriving the tripartite functional architecture of visual motion perception.</td>
</tr>
</tbody>
</table>


2000  †Sperling, G. Optical Society of America, Providence, Rhode Island, Workshop on Chromatic Motion Mechanisms, October 23. *The Mechanism of Isoluminant Red-Green Motion Perception*


2001  Sperling, G. Twenty-Sixth Annual Interdisciplinary Conference, Jackson, Wyoming, January 25, 2001 *Measuring iconic memory with EEG.*


2001  *Tseng, C.-h., and Sperling, G. Talk presented by Chia-huei Tseng. International Conference on Cognitive Science, Beijing, China August 27, 2001. *Sensitization to color: Induced by instructions, measured by motion*


2002 Sperling, G. Twenty-Seventh Annual Interdisciplinary Conference, Jackson, Wyoming, February 5, 2002 Third-order Motion and Motion Standstill


2002 Sperling, George. 98th Annual Meeting of the Society of Experimental Psychologists University of California, Berkeley April 6, 2002 Third-Order Motion.


2003 Sperling, George. Twenty-Eighth Annual Interdisciplinary Conference, Jackson, Wyoming, February 6, 2003 Deriving the Properties of Motion Systems from a Motion-Competition Paradigm


2004 †Sperling, G. 11th Joint Symposium on Neural Computation, University of Southern California, Los Angeles, California, May 15, 2004. A linear systems approach to modeling the spatial distribution of visual attention.


2005 Sperling, G. An Anniversary Conference Celebrating Steve Grossberg@65 and CNS@15, Department of Cognitive and Neural Sciences, Boston University, September 16, 2005. Some simple neural circuits for brain micro-instructions.


2006 Sperling, G. and Ding, J. 102nd Annual Meeting of the Society of Experimental Psychologists University of California, San Diego March 24, 2006 A Model for Binocular Combination: A neurally-plausible mathematical theory of how the two eyes combine information and some supporting evidence


2006  *Sperling, G., and Ding, J. Vision Sciences Society, Sarasota, Florida, May 9, 2006, An Early Gain-Control Mechanism in Binocular Combination


2006  †Sperling, G., and Ding, J. 12th Joint Symposium on Neural Computation, University of California, San Diego, California, May 20, 2006. Deriving the Parameters of Binocular Combination.


2006  *Tseng, C.-h., and Sperling, G. Talk presented by Chia-huei Tseng. XXIX European Conference on Visual Perception, Saint Petersburg, Russia, August 21, 2006. Two distinct attentional mechanisms revealed by the third-order motion paradigm


2010  Sperling, G. Thirty-Fifth Annual Interdisciplinary Conference, Jackson, Wyoming, Modeling the time course of the first few seconds of binocular rivalry.


2013 George Sperling, Sun Peng, Charles E. Wright, and Charles Chubb Talk presented by G. Sperling. Twelfth Annual Summer Interdisciplinary Conference, Cortina d’Ampezzo, Italy, July 26, 2013. Using centroid judgments to measure attention filtering

2013 ††*Sperling, G. Fall Vision Meeting, Optical Society of America, School of Optometry, University of Houston, Houston, Texas. October 5, 2013. Measuring the time course of the information available in brief visual presentations.


2017 Winter, A. N., Wright, C. E., Chubb, C., and Sperling, G. Poster presented by A. N. Winter, Vision Sciences Society, Saint Petersburg, Florida, May 20, 2017, *Conjunctive targets are better than or equal to both constituent feature targets in the centroid paradigm.*
Invited Lectures at Universities and Institutes


1963 Vassar College, Department of Psychology Colloquium, December 11, 1963. *Short-Term Memory.*


1964 Duke University, Department of Psychology Colloquium, April 29, 1964. *Short-Term Memory.*

1964 University of Pennsylvania, Department of Psychology Colloquium, April 15, 1964. *Short-Term Memory.*


1965 Northeastern University, Department of Psychology Colloquium, March 5, 1965. *Processing Visual Information.*


1967 University of Michigan, Mental Health Research Center, Interdisciplinary Colloquium, January 24, 1967. *Models of Short-Term Memory.*


1968 University of California, Los Angeles, Regular Psychology Colloquium, January 11, 1968. *Short-Term Memory.*
<table>
<thead>
<tr>
<th>Year</th>
<th>Location</th>
<th>Event</th>
<th>Date</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1968</td>
<td>University of California, San Diego, Graduate Psychology Colloquium</td>
<td>February 8, 1968</td>
<td>Short-Term Auditory Memory</td>
<td></td>
</tr>
<tr>
<td>1968</td>
<td>University of California, Los Angeles, Interdisciplinary Colloquium on Mathematics in the Behavioral Sciences</td>
<td>March 1, 1968</td>
<td>A Model of Vision Based on Psychophysical Experiments and its Relations to Retinal Microstructure</td>
<td></td>
</tr>
<tr>
<td>1968</td>
<td>University of Oregon, Psychology Colloquium</td>
<td>March 8, 1968</td>
<td>Short-Term Auditory Memory</td>
<td></td>
</tr>
<tr>
<td>1968</td>
<td>University of Rochester, Center for Visual Science, Colloquium</td>
<td>April 17, 1968</td>
<td>A Model of the Retina Based on Psychophysical Experiments and Its Relations to Retinal Microanatomy</td>
<td></td>
</tr>
<tr>
<td>1968</td>
<td>McMaster University, Department of Psychology Colloquium</td>
<td>April 26, 1968</td>
<td>Short-Term Auditory Memory</td>
<td></td>
</tr>
<tr>
<td>1968</td>
<td>University of Pennsylvania, Philadelphia, Department of Psychology Colloquium</td>
<td>October 16, 1968</td>
<td>Deducing Neural Microstructure from Psychophysical Experiments</td>
<td></td>
</tr>
<tr>
<td>1968</td>
<td>Bell Telephone Laboratories, Holmdel N.J. Center 322 Seminar</td>
<td>October 25, 1968</td>
<td>Model of the Retina</td>
<td></td>
</tr>
<tr>
<td>1968</td>
<td>New York University, Washington Square College, Graduate Psychology Colloquium</td>
<td>November 22, 1968</td>
<td>Predicting Neural Microstructure from Psychophysical Experiments</td>
<td></td>
</tr>
<tr>
<td>1968</td>
<td>University of California, Santa Barbara, Department of Psychology, Colloquium</td>
<td>December 16, 1968</td>
<td>Auditory Short-Term Memory</td>
<td></td>
</tr>
<tr>
<td>1969</td>
<td>Rockefeller University, New York, Colloquium</td>
<td>May 2, 1969</td>
<td>Short-Term Memory. Auditory</td>
<td></td>
</tr>
<tr>
<td>1969</td>
<td>University of Sussex, Falmer-Brighton, Sussex, England, Laboratory of Experimental Psychology Colloquium</td>
<td>October 16, 1969</td>
<td>Predicting Neural Microanatomy from Psychophysical Experiments</td>
<td></td>
</tr>
<tr>
<td>1969</td>
<td>University College (University of London), Department of Psychology Colloquium</td>
<td>October 27, 1969</td>
<td>Predicting Neural Microanatomy from Behavioral Observations: An Illustration from Visual Psychophysics</td>
<td></td>
</tr>
<tr>
<td>1969</td>
<td>University of Reading, Reading, England</td>
<td>October 31, 1969</td>
<td>Deducing neural microstructure from psychophysical experiments</td>
<td></td>
</tr>
<tr>
<td>1970</td>
<td>Birkbeck College (University of London), Department of Psychology Colloquium</td>
<td>January 27, 1970</td>
<td>The Structure of Short-Term Memory</td>
<td></td>
</tr>
<tr>
<td>1970</td>
<td>Goldsmiths College (University of London), New Cross, London, Department of Psychology Colloquium</td>
<td>January 27, 1970</td>
<td>Short-term memory</td>
<td></td>
</tr>
<tr>
<td>1970</td>
<td>University of Edinburgh, Edinburgh, Scotland, Department of Psychology Colloquium</td>
<td>January 29, 1970</td>
<td>The Structure of Short-Term Memory</td>
<td></td>
</tr>
<tr>
<td>1970</td>
<td>University of Strathclyde, Glasgow, Scotland, Department of Psychology Colloquium</td>
<td>January 30, 1970</td>
<td>The Structure of Short-Term Memory</td>
<td></td>
</tr>
</tbody>
</table>


1971 University of Western Australia, Perth, Western Australia, Department of Psychology Colloquium, July 13, 1971. *Extremely Rapid Visual Search.*


1972 University of Massachusetts, Amherst, Massachusetts, Department of Psychology Colloquium, October 16, 1972. *Extremely Rapid Visual Search.*


1974 Georgia Institute of Technology, Atlanta, Georgia, Department of Psychology Colloquium, April 25, 1975. Extremely Rapid Visual Search.


1977 Bell Laboratories, Murray Hill, New Jersey. Two Talks:


1981 Rutgers University, Busch Campus, New Brunswick, N.J., Department of Psychology Colloquium, May 6, 1981. Time, Distance, and Feature Trade-offs in Visual Apparent Motion.


1981 University of Maryland, College Park, MD., Department of Psychology Colloquium, November 4, 1981. Measuring Attention.


1982 Northeastern University, Boston, Massachusetts, Department of Psychology Colloquium, October 21, 1982. *Image Processing of American Sign Language.*


1983 University of Illinois, Champaign-Urbana, Illinois, Department of Psychology Colloquia:

1983 University of Rochester, Rochester, New York:


1984 Stanford University, Stanford, California, Department of Psychology, Friday Seminar, February 17, 1984. *Attentional Theory of Information in Short-Term Visual Memory*


1984 University of California, Los Angeles, California, Department of Psychology Colloquium, April 5, 1984. *A Unified Theory of Attention and Signal Detection.*

1984 University of California at San Diego, La Jolla, California, Vision Lab Lunch Talk, April 19, 1984. *The Mechanism of Human Short-Range Motion Perception.*

1984 University of California at San Diego, La Jolla, California, Department of Psychology Colloquium, April 19, 1984. *Image Processing and the Logic of Perception.*


1984 Department of Psychology Colloquium, Johns Hopkins University, Baltimore, Maryland October 24, 1984 *The Logic of Perception.*

1984 Colloquium, Center for Adaptive Systems, Department of Mathematics, Boston University, Boston, Massachusetts, November 28, 1984. *The Dynamics of Visual Attention.*


1989 Department of Speech and Hearing Science, Co-Sponsored by Department of Psychology, Ohio State University, Columbus, Ohio, May 22, 1989. Information Processing of Visual Language -- ASL.


1990 Special Colloquium, Istituto di Neurofisiologia del C.N.R., Pisa, Italy, April 17, 1990. Linear and nonlinear visual processing.


1990 Rutgers University, Newark College of Arts and Sciences Psychology Department Colloquium, October 15, 1990. Computational Theories of Attention.

1990 Indiana University, Bloomington Indiana, Cognitivie Sciences Colloquium, November 1, 1990. Episodic Theory of the Dynamics of Spatial Attention.


1991 Shanghai Institute of Technical Physics, Shanghai, China, June 17, 1991. *How the Human Visual System Computes Visual Motion* [Host: Prof. Kuang, Ding Bo (Director, SITP); Translators: Dr. Zhang, Ming and Chen, Lulin.]

1991 Department of Computer Science, Shanghai Information-Technology Engineers Examination Center, Fudan University, Shanghai, China, June 18, 1991. *Neural Principles of Preprocessing for Human Pattern Recognition.* [Host: Prof. Wu, Lide (Director, SITEEC).]

1991 Department of Electronic Science and Technology, Institute of Applied Electronics, East China Normal University, Shanghai, China, June 20, 1991. *Measuring Attention and How the Human Visual System Computes Visual Motion* [Host: Prof. Weng, Moyoing (Chairman and Director); Translator: Dr. Zhang, Ming.]

1991 Department of Psychology, Beijing University, and Institute of Psychology, Chinese Academy of Sciences, Beijing, China, June 25, 1991. [Host: Prof. Jing, Qicheng (Director, Institute of Psychology)]

   Morning: *The Efficiency of Perception* [Translators: Dr. Zhang, Ken and Prof. Jing, Qicheng.]
   Afternoon: *Measuring Attention.* [Translator: Luo, Chun-Rong.]

1991 Computational Vision Laboratory, Institute of Biophysics, Chinese Academy of Sciences, Beijing, China, June 28, 1991. *First- and Second-Order Motion Perception.* [Host: Prof. Wang Shuo-Rong (Director, Institute of Biophysics); Translator: Prof. Wang, Yun-Jiu (Laboratory Director).]

1991 New York University, Cognitive Sciences Colloquium, September 12, 1991. *Is There Attentional Filtering of Items by Feature as Well as by Location?*

1992 Center for Adaptive Systems Boston University, February 25, 1992. *Is There Attentional Selection of Items by Feature as Well as by Location?*


1996 Marschack Interdisciplinary Colloquium on Mathematics in the Behavioral Sciences, sponsored by the Anderson School and the Department of Economics, with support from the Anderson School Dean, the School of Public Policy and Social Research Dean, the Blum Kovler Foundation, and the Sidney Stern Memorial Trust. University of California at Los Angeles, Los Angeles, CA, March 1, 1996. The Economics of Attention, and Other Tales.

1996 Dedication Ceremony for the new Cognitive and Neural Systems Building, Boston University, Boston, Massachusetts, April 19, 1996. Atoms of the Mind.


1996 Psychology Colloquium, University of Western Australia, Nedlands Australia. August 1, 1996. Atoms of the Mind: An Historical Overview of Theories of Attention.

Stages of Human Visual Perception.


1999 University of Freiburg, Freiburg, Germany, Departments of Neurology and Psychology, Joint Colloquium, September 1, 1999. Three systems of Visual Motion Perception: Historical Review, Current Status.


2000 University of Trier, Germany, Psychology Department Colloquium, September 7, 2000. Measuring and modeling the dynamics of visual spatial attention.


2001 Department of Psychology, University of Tokyo, Bunkyo-ku, Tokyo, Japan. September 7, 2001. The three systems theory of human visual motion perception: Review and Update

2002 Institut fuer Allgemeine Psychologie, Universitaet Leipzig (Seeburgerstr. 14-20, 04 103 Leipzig, Germany), March 27, 2002. Measuring and modeling the trajectory of visual spatial attention.


2002 Cognitive Seminar Series, Department of Psychology, University of California at Los Angeles, Los Angeles, CA, October 4, 2002. Motion and Attention: A review and update of the three systems theory of motion perception with demonstrations that an attention mechanism--the salience field--is a critical component of third-order motion perception, and illustrations of the use of third-order motion perception to quantitatively measure attentional amplification and to clarify the mechanisms of object perception.

2002 University of Southern California, Neuroscience Colloquium Series, October 9, 2002. Motion and Attention.

2002 University of California, San Diego, La Jolla, CA, Department of Psychology Colloquium, October 17, 2002. Motion and Attention: A review and update of the three systems theory of motion perception with demonstrations of an attention mechanism--the salience field--that is a critical component of third-order motion perception, and illustrations of the use of third-order motion perception to quantitatively measure attentional amplification and to clarify mechanisms of object perception.

2003 University of California, Irvine Institute of Brain Aging and Dementia, Alzheimer’s Center Seminar Series, Colloquium, April 21, 2003. A partial inventory of psychophysical paradigms that have been used to infer neural mechanisms of motion perception and attention.


2004 Departments of Psychology and of Neurology, University of Regensburg, Regensburg, Germany, Special Colloquium, June 25, 2004. *Eye Movements, Image Movements, and Attention*


2006 Department of Psychology, National Taiwan University, Taipei, R.O.C. Colloquium. October 18, 2006. *The functional architecture of visual attention.*


2015 Department of Psychology, Justus-Liebig-Universitaet, Giessen, Germany, Colloquium, June 29, 2015. *Demos for Academies forum* Visual attention as a filtering process that can be efficiently measured quantitatively by centroid methods.

2015 Leibniz Institute for Psycholgie Information, ZPID, Trier, Germany, Colloquium Traverensia, July 1, 2015. *Deriving computational models for the brain processes of visual attention.*