

Research and Education of Imaging Science in Chiba University

Hirohisa Yaguchi

History of Imaging Engineering in Chiba University

- 1920: Dept. of Graphic Arts, Tokyo Polytechnic College
- 1951: Dept. of Graphic Arts
 - Dept. of Photographic Engineering, Chiba University
- 1964: Institute of Natural Color Engineering
- 1976: Dept. of Image Science
- 1989: Dept. of Information Science
- 1998: Dept. of Information and Image Sciences
- 2007: Dept. of Informatics and Imaging Systems
 - Dept. of Image Science

Education of Imaging Science

- Department of Image Sciences
 - Images and Human Sensitivity (Prof. H.Kobayashi)
 - Development of Imaging Technology (Lectr. Kuwayama)
 - Image Record Engineering
 - Physical Chemistry for Image Science (Prof. Hoshino)
 - Advanced Materials for Image Science (Assoc. Prof. Takahara)
 - Practice of Image Making (Prof. Kobayashi)
 - Psychophysics (Assoc. Prof. Aoki)
 - Photo Creation Practice (Lectr. Suzuki)
 - Human and Images (Prof. H.Kobayashi)
 - Printing Engineering (Assoc. Prof. Koseki)
 - Design and Evaluation of Image Quality
 - Organic Chemistry for Imaging (Assoc. Prof. Miyagawa)
 - Sensing of Information on Properties of Materials (Assoc. Prof. Shiba)
 - Laser Engineering (Prof. Tateda)
 - Functional Polymer (Prof. N.Kobayashi)

Education of Imaging Science

- Department of Information and Imaging Systems
 - Introduction to Visual Information Processing (Prof. Yaguchi)
 - Color and Image (Prof. Yaguchi)
 - Theory of Image Analysis System (Prof. Manabe)
 - Computer Graphics (Assoc. Prof. Tsumura)
 - Fourier Transform for Information and Image Sciences (Prof. Horiuchi)
 - Media Art (Lectr. Sato)
 - Remote Sensing Technology (Prof. Kuze)
 - Digital Imaging System (Lectr. Kurosawa)
 - Image Electronics (Lectr. Nakaya)
 - Pattern Recognition (Assoc. Prof. Tsumura)

Education of Imaging Science

- Graduate School of Advanced Integration Sciences
 - Visual Science (Prof. Yaguchi)
 - Color Reproduction (Prof. Yaguchi)
 - Image Kansei Engineering (Prof. Kobayashi)
 - Image Evaluation and Analysis (Assoc. Prof. Tsumura)
 - Electronic Imaging (Prof. Horiuchi)
 - Pattern Recognition (Prof. Horiuchi)
 - Image Analysis (Assoc. Prof. Po-Chieh Hung)
 - Comparative Cognition (Prof. Jitsumori)

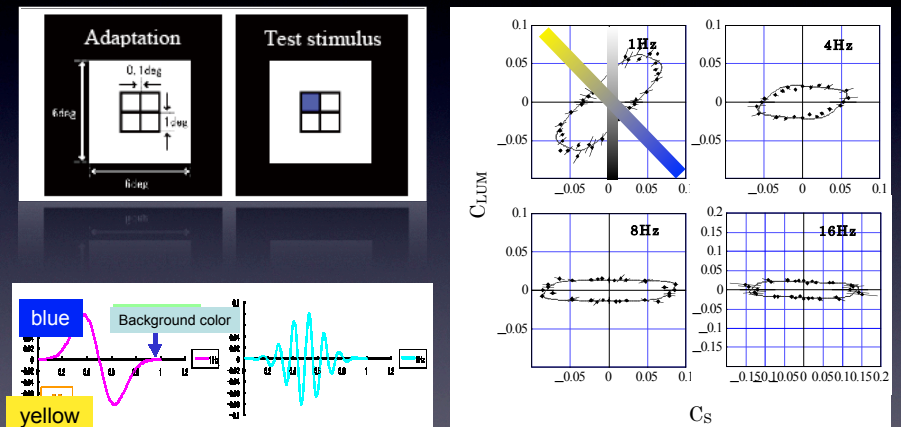
Vision Research Group in Chiba University

- Dept. of Information and Image Sciences, Faculty of Eng.
 - color vision, multispectral imaging, computer graphics, KANSEI engineering
- Dept. of Design, Faculty of Eng.
 - environmental humanomics, ergonomics
- Dept. of Architecture, Faculty of Eng.
 - lighting engineering, environmental design
- Dept. of Medical System Eng., Faculty of Eng.
 - brain imaging, fMRI, physiological optics, retina
- Div. of Behavioral Sciences, Faculty of Letter
 - cognitive and information sciences, psychology, comparative cognition

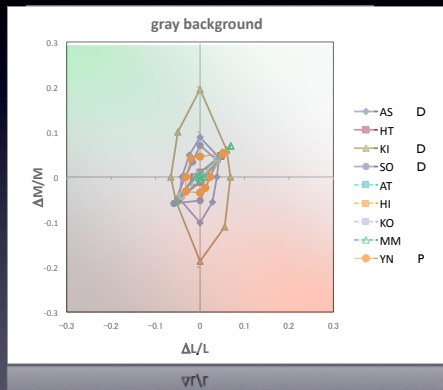
Current Research Projects in Yaguchi-Mizokami Labo

- Spatiotemporal aspects of color discrimination
- Color recognition and visual attention
- Color appearance in mesopic vision
- Color discrimination for color deficiencies and color universal design
- Analysis of image difference
- Measurement of contrast sensitivity functions
- Color rendering evaluation of solid state light sources
- Color appearance and discomfort glare of automotive headlamps
- Color appearance of human skin
- Perceived quality of wood image
- Natural environment and development of human color vision
- Color constancy and naturalness

Temporal characteristics of color discrimination



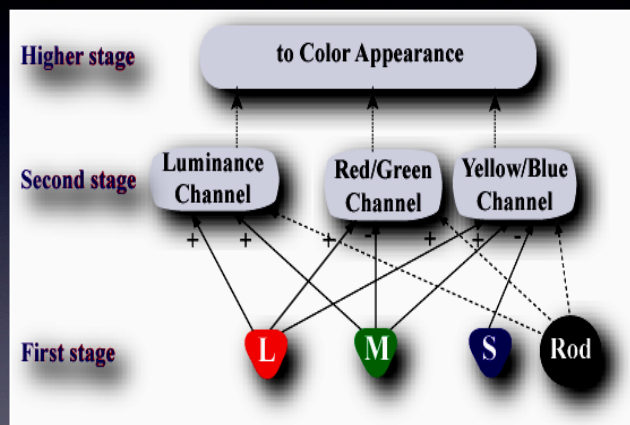
Color discrimination for color deficiencies



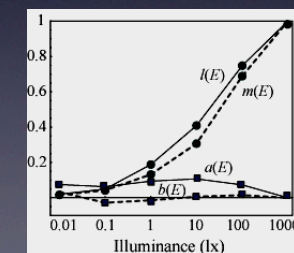
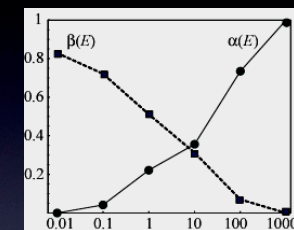
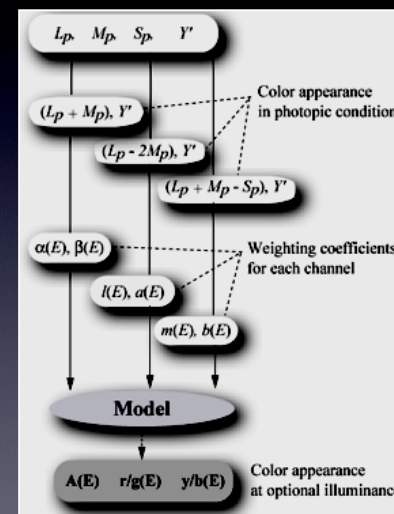
Published papers on color discrimination

- Correlation Between Visual and Colorimetric Scales Ranging from Threshold to Large Color Difference, Color Res.Appl.,Vol.27, No.5, 360-373 (2002) H.Xu, S.Shioiri, H.Yaguchi
- Color Discrimination Characteristics Depending on the Background Color in the (L, M) Plane of a Color Space, OPTICAL REVIEW,Vol.10 No.5, 391-397 (2003) K.Kawamoto, T.Inamura, S.Shioiri, H.Yaguchi
- Visual Evaluation at Scale of Threshold to Suprathreshold Color Difference, Color Res.Appl., Vol.30, No.3, 198-3208 (2005) H.Xu, H.Yaguchi

Color appearance in mesopic vision



Color appearance model in mesopic vision



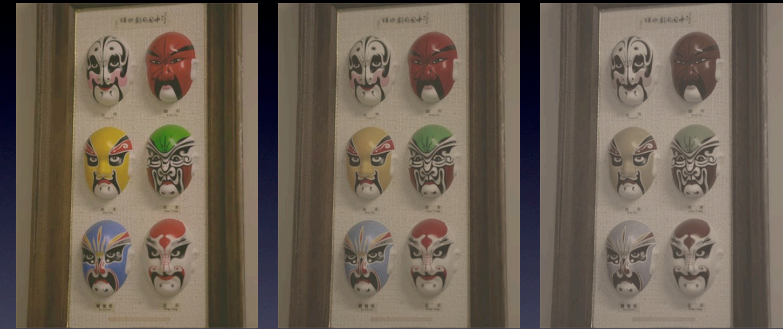


Original image

100 lx

10 lx

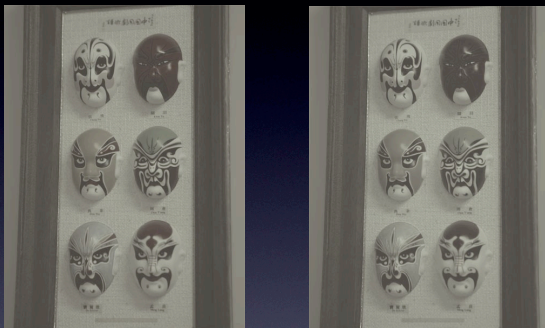
1 lx



Simulation

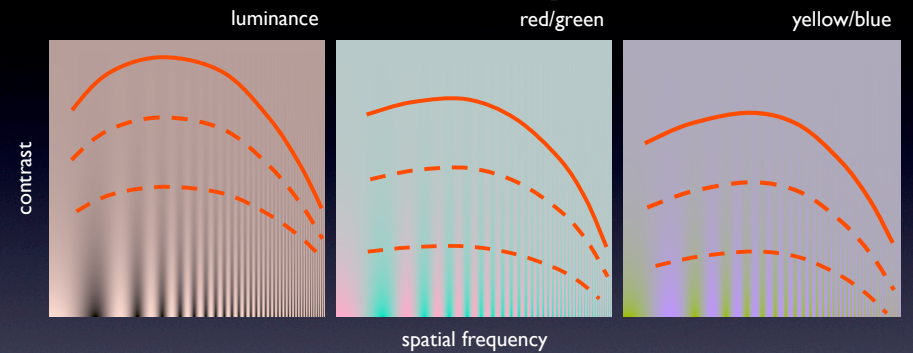
0.1 lx

0.01 lx

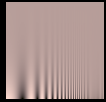


Simulation

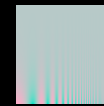
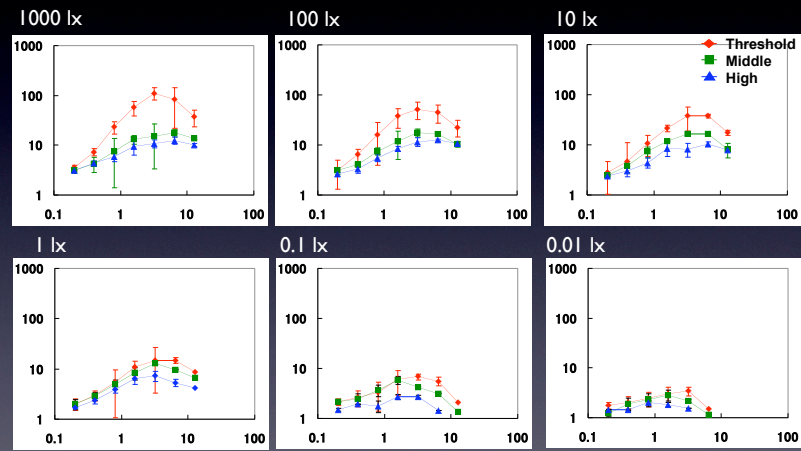
Contrast sensitivity functions



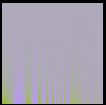
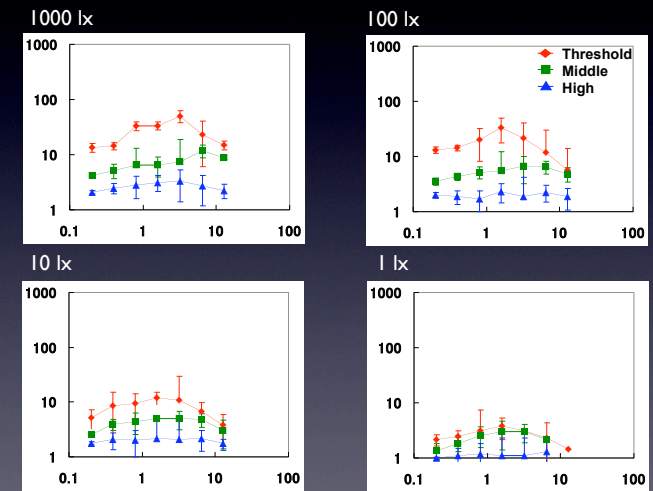
- Contrast threshold
- Suprathreshold: contrast matching
 - Middle contrast
 - High contrast



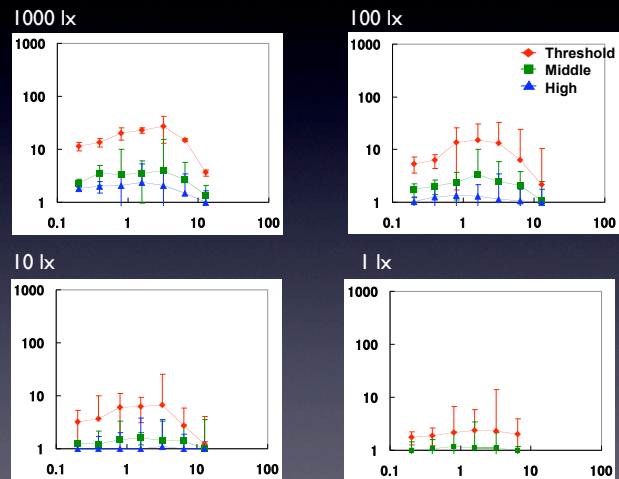
CSFs of luminance modulation



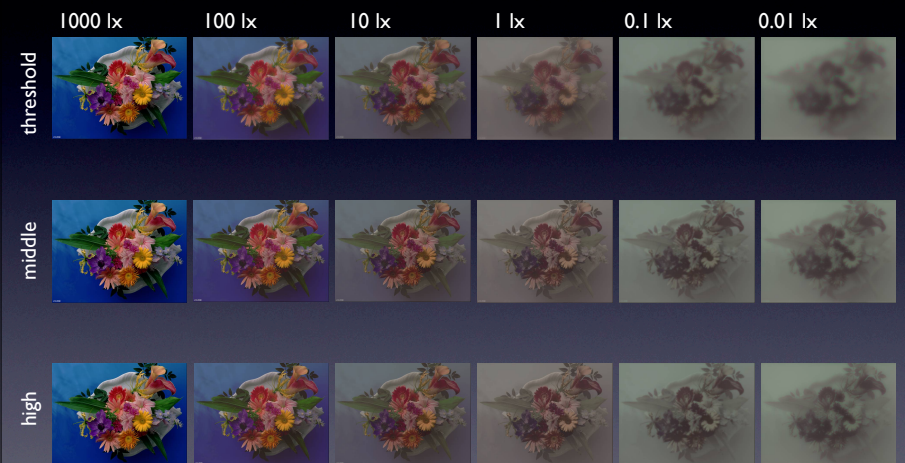
CSFs of red/green modulation



CSFs of yellow/blue modulation



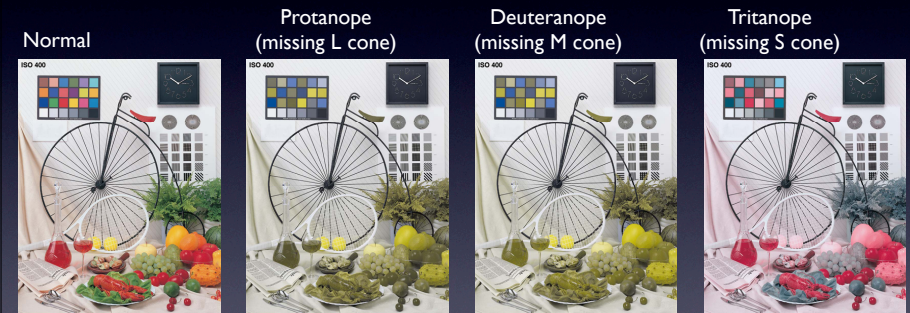
Simulation results



Published papers on color appearance in mesopic vision

- Change of Color Appearance in Photopic, Mesopic and Scotopic Vision, OPTICAL REVIEW, Vol. 11 No. 4, 265-271 (2004) JC.Shin, H.Yaguchi, S.Shioiri
- A Color Appearance Model Applicable in Mesopic Vision, OPTICAL REVIEW, Vol. 11 No.4, 272-278 (2004) JC.Shin, N.Matsuki, H.Yaguchi, S.Shioiri
- Imaging system for mesopic vision, Proceedings of the 10th Congress of International Colour Association, Part I, pp.251-254 (2005) H.Yaguchi, Y. Ushio, DK.Thanh, JC. Shin, S. Shioiri

Color appearance for dichromats



Color appearance for anomalous trichromats



Published papers on color universal design

- Quantification of Color Universal Design for Red-green Color Blind, VISION, 18, 231 (2006), M.Ozawa, H.Yaguchi, presented at the 4th Asian Conference on Vision.
- The dichromat's color appearance considering viewing conditions, J. Col. Soc. Assoc. Japan, vol.32, 175-184 (2008) M.Yoshizawa, H.Yaguchi

Color Vision and Application to Imaging Science

