

# Mark D. Fairchild

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<b>Internet:</b>	mark.fairchild@rit.edu markfairchild.org whyiscolor.org
<b>Physical:</b>	Munsell Color Science Laboratory College of Science Rochester Institute of Technology One Lomb Memorial Drive Rochester, New York 14623
<b>Education:</b>	Ph.D., 1990                      M.A., 1989 Vision Science (Human Sensation and Perception), URochester  M.S., 1986                      B.S., 1986 <i>summa cum laude</i> Imaging Science, Rochester Institute of Technology
<b>Appointments:</b>	June 2024 - May 2026    Rochester Institute of Technology Distinguished Professor, PoCS / MCSL  June 2022 - May 2024    Rochester Institute of Technology Professor, PoCS / MCSL  June 2017 - May 2022    Rochester Institute of Technology Founding Head, Integrated Sciences Academy Professor & Director, PoCS / MCSL  Aug. 2010 - May 2017    Rochester Institute of Technology Associate Dean of Research & Graduate Education, College of Science Professor & Director, PoCS / MCSL <i>Color Science Program Director, 2008 - 2011</i> <i>Director, Munsell Color Science Lab, 2013 - 2017</i> <i>Director, Program of Color Science, 2013 - 2017</i>  July 1999 - Aug. 2010    Rochester Institute of Technology Professor, Imaging Science <i>Director, Munsell Color Science Lab, 1996 - 2008</i> <i>Xerox Professor of Color Science, 2003 - 2006</i>  July 1997 - Aug. 1998    Cornell University Visiting Associate Professor, Computer Graphics  July 1994 - June 1999    Rochester Institute of Technology Associate Professor, Imaging Science <i>Color Science M.S. Coordinator, 1991 - 1994</i> <i>Imaging Science Ph.D. Coordinator, 1994 - 1996</i> <i>Director, Munsell Color Science Lab, 1996 - 1999</i>  July 1990 - June 1994    Rochester Institute of Technology Assistant Professor, Imaging Science <i>Awarded Tenure: September 1993</i>

July 1987 - June 1990	Rochester Institute of Technology Instructor, Imaging Science
July 1986 - June 1987	Rochester Institute of Technology Instructor, Color Science
March 1986 - May 1986	Rochester Institute of Technology Adjunct Faculty, Department of Color Science
Sept. 1983 - May 1986	Rochester Institute of Technology Research Assistant, Munsell Color Science Lab Student Assistant, Chemistry Library Mathematics & Physics Tutor, Special Services

### **Studies in Viticulture & Enology:**

University of California-Davis Winemaking Certificate, 2021  
Cornell University Winemaking Certificate, 2023  
Cornell University Viticulture & Enology Experience, CUVÉE, 2010  
Wine and Spirits Education Trust (WSET) Level 2 Award in Wines and Spirits with Merit, 2017  
UC-Davis Wine Tasting: Sensory Techniques for Wine Analysis, 2019  
University of Adelaide World of Wine: From Grape to Glass, 2016  
Rochester Institute of Technology HPST-163 Wine Connoisseur, 2020  
New York Wine and Grape Foundation, New York Wine Industry Certificate, 2017  
WSET Level 3 & 4 Study Programs, 2018-20  
Society of Wine Educators CSW & CSS Programs, 2017-18

### **Biographical Sketch:**

Mark Fairchild was born and raised in Trumansburg, New York where he graduated with honors from C.O. Dickerson High School. He entered Rochester Institute of Technology as a freshman in the Photographic Science program and graduated four years later with B.S. and M.S. degrees from that program, which had been renamed Imaging Science. He was a research assistant to Prof. Franc Grum in the newly formed Munsell Color Science Laboratory. Upon completion of his B.S. and M.S. degrees, he joined the Department of Color Science at R.I.T. and currently holds a tenured faculty position as an R.I.T. Distinguished Professor in the Program of Color Science (PoCS) and Munsell Color Science Laboratory (MCSL). He undertook a Ph.D. program at Rochester's Center for Visual Science, while continuing his work at R.I.T., earning that degree in 1990 after two and a half years of study.

From 1996 to 2008, he was Director of the Munsell Color Science Laboratory, overseeing significant growth and the move to Color Science Hall, which has been renamed the "Munsell Color Science Laboratory". In 2010, he was appointed Associate Dean of Research and Graduate Education of R.I.T.'s College of Science. While continuing his work as Associate Dean, he resumed leadership roles in color science in 2013 by becoming the Director of MCSL and founding Director of PoCS. In 2017, Mark became founding Head of the Integrated Sciences Academy within R.I.T.'s College of Science while remaining Director of PoCS and MCSL, which became part to of the Integrated Sciences Academy. The Integrated Sciences Academy is a novel academic unit that houses multidisciplinary science programs and promotes multidisciplinary research and education. Mark was designated as an RIT Distinguished Professor in 2024, the highest academic title at the university.

Dr. Fairchild has been actively involved in research in the areas of colorimetric measurement and standardization, color perception, color vision, color-appearance modeling, digital color reproduction, image quality, and computer graphics. He has authored/co-authored more than 400 papers, presentations, and technical reports, including more than 100 peer-reviewed journal articles. His most cited research works are in the areas of color appearance models, image

appearance models, high-dynamic-range (HDR) imaging, human color vision, and color reproduction. He has also supervised the graduate research of over 60 M.S. or Ph.D. students. The third edition of his book, *Color Appearance Models*, was published in 2013, following on the publication of the successful second edition in 2004 and first edition in 1997. Mark also co-edited the 2015 *Handbook of Color Psychology*. He spent the 1997-98 academic year on sabbatical leave as a Visiting Associate Professor in Cornell University's Program of Computer Graphics, a 2007 sabbatical creating the *HDR Photographic Survey* and *The Color Curiosity Shop*, and is in the midst of a 2022-23 sabbatical to conceive a new system of colorimetry and create a book on trees and the Munsell System. Additional activities, honors, and awards are listed below.

### **Professional Affiliations:**

#### **ISCC (Inter-Society Color Council)\***

*Co-Chair, IG #II, Appearance, Vision, & Modeling, 1991-1992*  
*Chair, IG #I, Basic & Applied Color Research, 1992-1995*  
*Board of Directors, 1995-1998*  
*Chair, 67th Annual Meeting, 1998 (with OSA)*  
*Program Committee, 2<sup>nd</sup> Panchromatic Conference, 2000*  
*Macbeth Award Committee, 2004-2010*  
*Liaison with OSA, 2015-Present*  
*ISCC / AIC 2018 Munsell Celebration, Papers Chair, Core Committee, 2016-2018*  
*ISCC / AIC Color Literacy Project, Consultant, 2019-present*

#### **IS&T (Society for Imaging Science and Technology)\***

*Fellow, 2003*  
*Technical Committee, SPIE/IS&T EI Image Quality & System Performance Conference, 2003-2015*  
*Color Imaging Editor, J.Im.Sci.Tech., 1999-2002*  
*Scientific Technical Committee, CGIV 2002, 2008*  
*General Chair, PICS Conference, 2003*  
*Image Science Track Chair, International Congress of Imaging Science, 2006*

#### **SID (Society for Information Display)\***

*Technical Co-Chair, IS&T/SID Color Imaging Conference, 1994*  
*Technical Committee, IS&T/SID Color Imaging Conference, 1994-2004*

#### **VSS (Vision Sciences Society)**

#### **Optica Color Technical Group\***

#### **Optica Vision Technical Group\***

#### **Optica Applications of Visual Science Technical Group\***

#### **Optica (Formerly OSA)**

*Fellow, 2012*  
*Senior Member, 2010*  
*Voting Delegate to ISCC, 1990-2015*  
*Liaison with ISCC, 2015-2019*  
*Representative to CIE, 2003-2019*  
*Councilor, Rochester Section, 1996-1997*

#### **CLSC (Chautauqua Literary & Scientific Circle)\***

#### **TS (The Thoreau Society)\***

#### **SWE (Society of Wine Educators)**

#### **AIC (International Color Association)**

*AIC2015 / MCS2015 International Scientific Committee, 2014-2015*  
*AIC2017 International Scientific Committee, 2016-2017*  
*AIC / ISCC 2018 Munsell Symposium, Papers Chair, 2016-2018*

#### **AAAS (American Association for the Advancement of Science)**

#### **USNC - CIE (Commission International de L'Éclairage)**

*Chair, TC1-34, Testing Colour Appearance Models, 1991-1999*  
*Reporter, R1-24, Colour Appearance Models, 1999-2003*  
*Reporter, R8-05, Image Appearance, 2003-2008*  
*Reporter, R8-08, Image Appearance Model Framework, 2008-2010*  
*Member, TC1-27, Specification of Colour Appearance for Reflective Media and Self-Luminous Display Comparisons, 1990-2011*

Member, TC1-48, *Revision of CIE Document 15.2 Colorimetry*, 1997-2004  
Member, TC1-52, *Chromatic Adaptation Transforms*, 1998-2005  
Member, TC1-55, *Uniform Colour Space for Industrial Colour Difference Evaluation*, 2005-2016  
Member, TC1-56, *Improved Colour Matching Functions*, 1999-2009  
Member, TC1-60, *Contrast Sensitivity Function for Detection and Discrimination*, 2002-2011  
Member, TC1-75, *A Comprehensive Model of Colour Appearance*, 2009-2015  
Member, TC1-82, *The Calculation of Colour Matching Functions as a Function of Age and Field Size*, 2012-2015  
Member, TC8-01, *Colour Appearance Modeling for Colour Management Applications*, 1998-2005  
Member, TC8-02, *Colour Difference Evaluation in Images*, 2000-2011  
Member, TC8-03, *Gamut Mapping*, 1998-2006  
Member, TC8-08, *Testing of Spatial Color Appearance Models*, 2003-2008  
Member, TC8-10, *Office Lighting for Imaging*, 2006-2015  
Member, TC8-11, *CIECAM02 Mathematics*, 2007-2016  
Advisor, JTC10, CAM16, 2017-2017

CORM (Council for Optical Radiation Measurements)

ACM-SIGGRAPH (Association for Computing Machinery-Special Interest Group on Graphics)  
Program Committee, *Symposium on Applied Perception in Graphics and Visualization*, 2006-2010

IEEE

*Transactions on Image Processing*, Associate Editor, *Special Issue on Color*, 1997  
*Workshop on Color and Photometric Methods in Computer Vision*, Program Committee, 2003

Multispectral Color Science

*Technical Committee*, 2001

International Workshop on Video Processing and Quality Metrics

*Technical Program Committee*, 2006-2014

American Society of Cinematographers

Member, *Motion Imaging Technology Council*, 2004-2026

TASCII (Tsinghua University Art & Science Research Centre, Color & Imaging Institute)

Member, *TASCII Advisory Board*, 2010-2026

HCCB (Houston Center for Biomaterials and Biomimetics of The University of Texas Dental Branch at Houston)

*Adjunct Senior Scientist*, 2011-2026

TandemLaunch, Inc.

*Fellow*, 2015-2026

(\* = current member)

## Honors & Awards:

2024 Rochester Institute of Technology Distinguished Professor  
2021 Godlove Award (Inter-Society Color Council)  
2021 Otto Schade Prize (Society for Information Display)  
2020 Rochester Institute of Technology Trustees Scholarship Award  
2018 Nickerson Service Award (Inter-Society Color Council)  
2017 Society of Motion Picture and Television Engineers (SMPTE) Journal Certificate of Merit Award  
2012 Scientific Divuligation Award of the University of Granada (Awarded 2013)  
2012 Fellow, The Optical Society (OSA)  
2010 Senior Member, The Optical Society (OSA)  
2008 Raymond C. Bowman Award (IS&T)  
2007 Davies Medal (Royal Photographic Society)  
2003 Fellow, Society for Imaging Science & Technology (IS&T)  
2002 Macbeth Award (Inter-Society Color Council)  
1995 C. James Bartleson Award (The Colour Group of Great Britain)  
Best Interactive Paper - Cactus Award, 2022 *IS&T Color & Imaging Conf.* (L. Hellwig et al.)  
Outstanding Student Paper Award, AIC 2022 "*Sensing Colour*" (H. Xie et al.)  
R.W.G. Hunt Best Paper Award, 2021 *IS&T Color & Imaging Conference* (H. Xie et al.)  
Best Student Paper Award Runner Up, 2021 *IS&T Color & Imaging Conf.* (C. Shen et al.)  
Wolfgang Straßer Award, (3<sup>rd</sup> Best Paper) High Performance Graphics 2020 (Andersson et al.)  
Best Paper Award, 2007 *ITE/SID International Display Workshops* (M. Sakurai et al.)  
Best Interactive Paper - Cactus Award, 2020 *IS&T Color & Imaging Conf.* (F. Jiang et al.)

MERL Best Student Paper Award, *2013 IS&T Color & Imaging Conference* (Y. Asano et al.)  
Best Paper Award, *VPQM 2010 - International Workshop on Video Processing and Quality Metrics* (Fairchild)  
Best Interactive Paper - Cactus Award, *2007 IS&T/SID Color Imaging Conf.* (Fairchild)  
Best Interactive Paper - Cactus Award, *2004 IS&T/SID Color Imaging Conf.* (R.Patil, Fairchild and Johnson)  
10-Year Author Award, *2002 IS&T/SID 10<sup>th</sup> Anniversary Color Imaging Conference*  
Best Interactive Paper - Cactus Award, *1997 IS&T/SID Color Imaging Conf.* (G.Braun and Fairchild)  
Best Interactive Paper - Cactus Award, *1995 IS&T/SID Color Imaging Conf.* (K.Braun and Fairchild)  
Images in the RPS Collection of the National Science+Media Museum (Bradford, UK)  
Images in the ISCC Color Impact 2023 Art Exhibition (Rochester)  
Image in the ISCC/AIC Munsell 2018 Symposium Art Show (Boston)  
Xerox Distinguished Lectureship  
NYSTAR-CEIS Technology Transfer Award  
IBM Faculty Award  
Du Pont Young Professor Grant  
Numerous Industrial & Government Research Grants & Contracts  
SPSE (IS&T) Raymond Davis Scholarship, 1986  
NALC William C. Doherty Scholarship, 1982  
National Merit Letter of Commendation  
New York State Regents Scholarship  
Highest Avg. in Mathematics, Greatest Proficiency in Science (C.O. Dickerson High School)

**Graduate Students Supervised, Topics:** (\*=Ph.D.)

Amy North, Investigation of Observer Variability in Color Matching Functions  
Mike Stokes, Colorimetric Tolerances of Digital Images  
Brian Rose, Color Logic: Interactively Defining Color in the Context of Computer Graphics  
Nathan Moroney, Color Space Selection for JPEG Image Compression  
Elizabeth Pirrotta, Testing Chromatic-Adaptation Models Using Object Colors  
Audrey Lester, Color Reproduction of CRT-Displayed Images as Projected Transparencies  
Mike Mongeon, Image Transformation into Device-Independent Color ...  
Rick Alvin, Computational Analysis of Observer Metamerism in Cross Media Color Matching  
Susan Farnand, Effect of Image Content on Color Difference Perception  
\*Karen Braun, Color-Appearance Modeling for Cross-Media Image Reproduction  
Cathy Daniels, Effect of Surround on Perceived Lightness Contrast of Pictorial Images  
Dalei Huang, Monte Carlo Simulation of 2AFC Experiments  
Jack Rahill, Sensitivity Analysis of Nayatani's Color Appearance Model  
Chris Hauf, Iris Explorer Modules for Color Appearance and Reproduction  
Alex Vaysman, Color Image Quantization and Spatial Resolution  
Mihai Cuciurean-Zapan, Color Preference Reproduction of Ink-Jet Prints  
Garrett Johnson, High-Resolution Spectral Computer Image Synthesis  
\*Fritz Ebner, Preferred Color Reproduction, Gamut Mapping, and Constant Hue Perception  
Mark Shaw, Evaluation of Color Matching Functions and Observer Metamerism  
Barb Grady, Illuminant Sensitivity of Printing Materials  
Richard Suorsa, Color Identification under Simulated Chromatic Illumination  
Kathy Loj, Impact of ICC Monitor Profile Settings on Printed Images  
Jonathan Phillips, Evaluation of S-CIELAB using Halftone Color Patches  
\*Gus Braun, Color Gamut Mapping Algorithms  
Susan Lubecki, Performance Testing of ICC Profiles,  
Sharron Henley, Color Appearance for Cross-Media Comparisons in Mixed Adaptation  
Sergio Gonzalez, Fluorescence Spectrophotometry of Printing Materials  
Michael Sanchez, Lightness of Chromatic Video Colors  
Sun Ju Park, Black-Point Adaptation  
Meredith Graham, Color Image Quantization  
Jason Gibson, Color Discrimination in Images on Various Displays

Barb Grady, Ink Jet Ink Optimization  
Scot Fernandez, Color Preference Reproduction  
Anthony Calabria, Image Contrast Perception and Modeling  
Jason Babcock, Eye-Movements in Color Imaging Psychophysics  
David Robinson, Psychophysical Red on EP Prints  
\*Garrett Johnson, Image Quality Metrics  
Scot Fernandez, Measuring Preferences with an Image Difference Metric  
\*Qun Sun, Spectral, Portraiture and Image Quality  
Xiaoyun Jiang, Illuminant Estimation Algorithms  
Xiaoyan Song, Chromatic Noise Perception and Modeling  
Rohit Patil, Image Rendering for Print Simulation  
Jim Leland, Image Processing Bi-Spectral Fluorescence Matrices  
Jim Hewett, Computing the Appearance of Mars Rover Images  
Tim Hattenberger, Augmented Reality and Image Difference Perception  
Joseph Stellbrink, Visual Masking of Display Defects  
\*Jiangtao Kuang, High-Dynamic-Range Image Tone Mapping  
Ken Fleisher, Perceptual Image Categories  
\*Hongqin Zhang, Visualization of Spectral Image Information  
Abhijit Sarkar, Assessment of Moving Image Quality  
Stacey Casella, Expansion of Content to Fill WCG Displays  
\*Rod Heckaman, Perceptual Color Gamuts and Brilliance  
John Grim, Review of Gamut Mapping  
Ping-Hsu Chen, Lightness Perception Above Diffuse White  
\*Susan Farnand, Image Content in Image Quality Assessment  
\*Adrià Forés Herranz, Measuring and Modeling Gloss Appearance  
\*Yuta Asano, Observer Metamerism and Observer Categories  
\*David Long, Spectral Imaging in Motion Picture Science  
Christopher Thorstenson, Measuring Physiological Changes in Skin Color  
Morteza Maali Amiri, Spectral Reconstruction from RGB Images and Cone Responses  
\*Fu Jiang, HDR-WCG Appearance  
\*Adi Robinson, Image Quality & Usability in Medical Displays  
Ben Bodner, Estimating Paint Concentrations from Spectral Images  
Yue Yuan, Observer Categories  
\*Hao Xie, Representing Color as Multiple Independent Scales  
\*Luke Hellwig, Metamerism, Hue, & Individual Differences  
\*Che Shen, Observer Metamerism & Color Change Gems  
\*Saeedeh Abasi, Mathematical Modeling of Hue Perception

### **Books:**

M.D. Fairchild, *Munsell Trees: A Season of Leaves and Colors*, RIT Press, Rochester, **in press** (2024).

A. Elliott, M.D. Fairchild, and A. Franklin, Eds. *Handbook of Color Psychology*, Cambridge University Press, Cambridge, UK (2015).

M.D. Fairchild, *Color Appearance Models, Third Edition*, Wiley-IS&T Series in Imaging Science and Technology, Chichester, UK (2013).

M.D. Fairchild and M. Melgosa, *La Tienda de las Curiosidades Sobre el Color (The Color Curiosity Shop, Spanish Translation)*, Editorial Universidad de Granada (2012).

M.D. Fairchild, *The Color Curiosity Shop, Abridged Edition*, MDF, Honeoye Falls, (2011).

M.D. Fairchild, *The Color Curiosity Shop*, MDF, Honeoye Falls, (2011).

M.D. Fairchild, *The HDR Photographic Survey*, MDF, Honeoye Falls, (2008).

M.D. Fairchild, *Color Appearance Models, Second Edition*, Korean Translation, Sigma Press, Seoul (2007).

M.D. Fairchild, *Color Appearance Models, Second Edition*, Wiley-IS&T Series in Imaging Science and Technology, Chichester, UK (2005).

M.D. Fairchild, *Color Appearance Models*, Addison-Wesley, Reading, MA (1998).

### **Internet Resources:**

*The HDR Photographic Survey*, <[markfairchild.org/HDR.html](http://markfairchild.org/HDR.html)>.

*Color Curiosity Shop*, <[whyiscolor.org](http://whyiscolor.org)>.

*Ask A Color Scientist*, <[mcsl.rit.edu](http://mcsl.rit.edu)>.

### **Publications & Presentations** (*Invited Presentations Follow Below*):

C. Shen and M.D. Fairchild, Individual color matching functions from cross-media color-matching experiment, *Color Research and Application* **49**, **submitted** (2024).

C. Shen and M.D. Fairchild, Equalization of appearance using individualized unique hues, *IS&T Electronic Imaging 2024*, **in press** (2024).

L. Hellwig, D. Stolitzka and M.D. Fairchild, The brightness of chromatic stimuli, *Color Research and Application* **48**, 10.1002/col.22910 113-123(2023).

E. Robert, C. Shen, M.D. Fairchild, M. Estriebeau and E. Cucchetti, Color correction of Mars planet images: A study of illumination discrimination along solight locus, *IS&T 31st Color and Imaging Conference*, Paris, **in press** (2023).

L. Hellwig, D. Stolitzka and M.D. Fairchild, Novel methods of brightness and saturation testing for High- Dynamic-Range Images , *IS&T 31st Color and Imaging Conference*, Paris, **in press** (2023).

E. Robert, C. Shen, M.D. Fairchild, M. Estriebeau and E. Cucchetti, Color correction of Mars planet images: A study of illumination discrimination along solight locus, *Journal of Imaging Science and Technology* **67**(5), 1-9 (2023).

L. Hellwig, D. Stolitzka and M.D. Fairchild, Improvements to CIECAM16 and future directions, *CIE 30th Quadrennial Session*, Slovenia, PP11 659-668(2023).

S. Abasi and M.D. Fairchild, Fundamental scales of hue appearance and discrimination, *Color Research and Application* **48**, 10.1002/col.22895 673-688(2023).

C. Shen and M.D. Fairchild, Weighted geometric mean (WGM) method: A new chromatic adaptation model, *PLOS One* **18**, e0290017 (2023).

M.D. Fairchild, Munsell meets Thoreau: A season of leaves and colors, P, *Thoreau Society Annual Gathering 2023*, Concord, MA (2023).

S. Abasi and M.D. Fairchild, Modeling hue perception, *ISCC Color Impact 2023* (2023).

L. Hellwig, D. Stolzka and M.D. Fairchild, The brightness of chromatic colors, *ISCC Color Impact 2023*, Rochester (2023).

M.D. Fairchild, Munsell Trees: A Season of Leaves and Colors, Photographs in Juried "Completely Color" Exhibition, *ISCC Color Impact 2023*, Rochester (2023).

M.D. Fairchild, Is color space a thing? OR There's no such thing as color space ... Prove me wrong, *ISCC Color Impact 2023*, Rochester (2023).

J.A.S. Viggiano and M.D. Fairchild, Beyond the pale (ale) and behind the blush (wine): The colors of potent potables, *ISCC Color Impact 2023*, Rochester (2023).

H. Xie and M.D. Fairchild, Deriving and dissecting an equally bright reference boundary, *Optics Express* **31**, 15637-15652(2023).

M.D. Fairchild, On the questionable utility of color space for understanding perception, *Color Research and Application* **48**, 10.1002/col.22853 260-266(2023).

H. Xie and M.D. Fairchild, Representing Color as Multiple Independent Scales: Brightness versus Saturation, *Journal of the Optical Society of America A* **40**, 452-461(2023).

M.D. Fairchild, Visual and photographic assessment of wine color, *Color Research and Application* **48**, 10.1002/col.22787 21-31(2023).

L. Hellwig and M.D. Fairchild, Revising CAM16-UCS, *IS&T 30th Color and Imaging Conference*, Scottsdale, A3-A5(2022).

C. Shen and M.D. Fairchild, Weighted geometric mean (WGM) method: A new chromatic adaptation model, *IS&T 30th Color and Imaging Conference*, Scottsdale, 231-235(2022).

M.D. Fairchild, Reversibility of corresponding colors in sensory chromatic adaptation, *IS&T 30th Color and Imaging Conference*, Scottsdale, 153-158(2022).

L. Hellwig, D. Stolzka and M.D. Fairchild, Why achromatic response is not a good measure of brightness, *IS&T 30th Color and Imaging Conference*, Scottsdale, 1-5(2022).

H. Xie and M.D. Fairchild, Representing color as multiple independent scales: Brightness vs. saturation, *IS&T 30th Color and Imaging Conference*, Scottsdale, i (2022).

L. Hellwig and M.D. Fairchild, Chromatic adaptation to heterochromatic illumination, *Optica Fall Vision Meeting*, Rochester, **in press** (2022).

C. Shen, A. Palke and M.D. Fairchild, Color origin of color change sapphire, *Geological Society of America CONNECTS 2022*, Denver, *Geological Society of America Abstracts with Programs* **54**(5), 10.1130/abs/2022AM-377878 (2022).

H. Xie and M.D. Fairchild, The Luther Condition for all: Evaluating colorimetric camera design for personalized color imaging, *AIC 2022 Sensing Colour*, Toronto, 420-426(2022).

C. Shen and M.D. Fairchild et al., Measuring display observer metamerism, *AIC 2022 Sensing Colour*, Toronto, 364-370(2022).



H. Xie and M.D. Fairchild, Isolating saturation and hue for equally bright colors, *VSS 2022*, St. Pete Beach, *Journal of Vision* **22**, 4108 (2022).

C. Shen, R. Wanat, J.J. Yoo, J. Jang and M.D. Fairchild, Measuring display observer metamerism, *The Visual Computer* **38**, 3301-3310, 10.1007/s00371-022-02546-7 (2022).

C. Shen, R. Wanat, J.J. Yoo, J. Jang and M.D. Fairchild, Measuring display observer metamerism, *Computer Graphics International 2022*, Geneva, (2022).

L. Hellwig, D. Stolzka and M.D. Fairchild, Extending CIECAM02 and CAM16 for the Helmholtz-Kohlrausch Effect, *Color Research and Application* **47**, 1096-1104, 10.1002/col.22793 (2022).

L. Hellwig and M.D. Fairchild, Brightness, lightness, colorfulness, and chroma in CIECAM02 and CAM16, *Color Research and Application* **47**, 1083-1095, 10.1002/col.22792 (2022).

L. Hellwig, D. Stolzka, Y. Yi and M.D. Fairchild, Brightness and vividness of high dynamic range displayed imagery, *SID International Symposium Digest of Technical Papers* **53**, 1009-1012 (2022).

H. Xie, R. Wanat and M.D. Fairchild, Perceived color gamut in images: From boundary to difference, *Frontiers in Neuroscience* **16**, 907697 doi: 10.3389/fnins.2002.907697(2022).

N.S. Smith and M.D. Fairchild, Virtual colour atlas, *Color Research and Application* **47**, 817-826, 10.1002/col.22780 (2022).

T. Canham, D.L. Long, M.D. Fairchild and M. Bertalmio,, Physiologically personalized color management for motion picture workflows, *SMPTE Motion Imaging Journal* **131:2**, 8-16(2022).

Y.Yuan, M.J. Murdoch and M.D. Fairchild, A multi-primary lighting system for customized color stimuli, *Color Research and Application* **47**, 74-91, 10.1002/col.22695 (2022).

M.D. Fairchild, Individual differences and the color science of images, *IS&T 29th Color and Imaging Conference*, ONLINE, invited (2021).

M.D. Fairchild, A digital test chart for visual assessment of color appearance scales, *IS&T 29th Color and Imaging Conference*, ONLINE, 160-165(2021).

C. Shen and M.D. Fairchild, The threshold of color inconstancy, *IS&T 29th Color and Imaging Conference*, ONLINE, 374-380(2021).

H. Xie and M.D. Fairchild,  $G_0$  revisited as equally bright reference boundary, *IS&T 29th Color and Imaging Conference*, ONLINE, 247-252(2021).

F. Jiang and M.D. Fairchild, Preliminary result on the direct assessment of perceptible simultaneous luminance dynamic range, *IS&T 29th Color and Imaging Conference*, ONLINE, 47-59(2021).

F. Jiang and M.D. Fairchild, Preliminary result on the direct assessment of perceptible simultaneous luminance dynamic range, *Journal of Imaging Science and Technology* **65**, 050401-1 — 050401-13 (2021).

C. Shen, A. Palke, Z. Sun and M.D. Fairchild, How to calculate color from spectra of uniaxial gemstones, *Geological Society of America CONNECTS 2021*, Portland, Paper 107-9 (2021).

- M.D. Fairchild, System for visual assessment of wine color, *Proceedings of the International Colour Association (AIC) Conference 2021*, Milan, 1047-1052(2021).
- C. Shen, A. Palke, Z. Sun and M.D. Fairchild, How to calculate color from spectra of uniaxial gemstones, *Gems & Gemology* **57**, 36-45 (2021).
- S. Abasi, M.A. Tehran and M.D. Fairchild, Color difference metric for stimuli with large color difference, *12th INTEC Conference, Iran* (2021).
- M.D. Fairchild, F. Jiang and H. Xie, Perception in HDR and displays, *Information Display* **37(3)**, 15-19 (2021).
- M.D. Fairchild, Chs. 37,42,47,49,75 in R. Shamey & R.G. Kuehni, *Pioneers of Color Science*, Springer, Switzerland (2020).
- M.D. Fairchild, Von Kries 2020: Evolution of degree of chromatic adaptation, *IS&T 28th Color and Imaging Conference*, ONLINE, 252-257 (2020).
- F. Jiang, M.D. Fairchild and K. Masaoka, Effect of peak luminance on perceptual color gamut volume, *IS&T 28th Color and Imaging Conference*, ONLINE, 13-18 (2020).
- Y. Park, M.J. Murdoch and M.D. Fairchild, Observer metamerism: Why do [mis]matches of neutral appear pinkish or greenish?, *IS&T 28th Color and Imaging Conference*, ONLINE, 7-12 (2020).
- L. Hellwig and M.D. Fairchild, Deriving a hue-uniform color space without visual data, *IS&T 28th Color and Imaging Conference*, ONLINE, 244-251 (2020).
- L. Hellwig and M.D. Fairchild, Deriving a hue-uniform color space without visual data, *Journal of Perceptual Imaging* **3**, 200401-1 - 20401-8 (2020).
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**Invited Presentations:**

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M.D. Fairchild, Color Inconstancy, Chromatic Adaptation, and Scales of Color Appearance, *Optica Color Technical Group Webinar*, (2023).

M.D. Fairchild, Dimensions and Scales of Color Appearance, *TLC Technology Innovation Conference*, Shenzhen, China (2022).

M.D. Fairchild, Color Dualism and Arboreal Transcendentalism, *ISCC Godlove Award Lecture*, ISCC Webinar (2022).

M.D. Fairchild, Why is color?, *FOGRA Color Management Café*, FOGRA Webinar, Munich (2021).

M.D. Fairchild, Individual differences and the color science of images, *IS&T 29th Color and Imaging Conference*, ONLINE, invited (2021).

M.D. Fairchild, Spatial color appearance models and image difference models (iCAM and the like), *VIPLab Webinar Series*, University of Valencia (2021).

M.D. Fairchild, The art of color science: Individual differences, *Proceedings of 2nd International Symposium for Color Science and Art*, Tokyo Polytechnic University, Japan (2021).

M.D. Fairchild, Some thoughts on color appearance (modeling), University of California - Berkeley, (2020).

F. Jiang, K. Masaoka and M.D. Fairchild, Subjective verification for color gamut volume of HDR WCG display, *ITE/SID 25th International Display Workshops*, Nagoya, invited paper VHF7 - 2 (2018).

M.D. Fairchild, One wine many colors, *IS&T 26th Color & Imaging Conference*, Vancouver, (2018).

M.D. Fairchild, Color appearance, color order, & other color systems, *ISCC Webinar*, August (2018).

M.D. Fairchild, Color appearance, color order, & other color systems, ISCC-AIC Munsell Centennial Color Symposium, Boston (2018).

M.D. Fairchild, Munsell's legacy: Foundation and laboratory, ISCC-AIC Munsell Centennial Color Symposium, Boston (2018).

M.D. Fairchild, Color education panel, ISCC-AIC Munsell Centennial Color Symposium, Boston (2018).

M.D. Fairchild (Presented By), R.S. Berns, Development of the Munsell color order system, ISCC-AIC Munsell Centennial Color Symposium, Boston (2018).

M.D. Fairchild, Individual differences in color matching & adaptation and illumination, *OSA Fall Vision Meeting*, Washington, D.C., *Journal of Vision* **17**, doi:10.1167/17/15/2a (2017).

M.D. Fairchild, Color perception: Contexts and individuals, *American Glass Guild Annual Meeting*, Rochester, May (2017).

M.D. Fairchild, From photon to brain: The perception of a color, *ISCC International Day of Color Webinar*, March 21(2017).

M.D. Fairchild, Color science: Perceiving color and individual differences, *IS&T Local Chapter*, Rochester (2016).

M.D. Fairchild, From photon to brain: The perception of a color, *IS&T 24th Color & Imaging Conference*, San Diego, 291-293 (2016).

M.D. Fairchild, Individual differences in color matching and adaptation: Importance in lighting, *Light + Color: IES Research Research Symposium III*, Gaithersburg, (2016).

M.D. Fairchild *et al.*, Hard-core panel: Non-convexity of the spectrum locus: A crime against color order? How guilty is human vision?, *IS&T 21st Color & Imaging Conference*, Albuquerque (2013).

M. Melgosa and M.D. Fairchild, *Inspiring future experimental scientists through questions related to colour*, *12th International Conference on Education and Training in Optics & Photonics*, Porto, Portugal, 25 (2013).

M.D. Fairchild, Color scales, *X National Congress of Color*, Valencia, Spain, 1 (2013).

M.D. Fairchild, Observer metamerism, *University of Granada*, Granada, Spain (2013).

M.D. Fairchild, Stimulating future scientists with color, *Parque de las Ciencias*, Granada, Spain (2013).

M.D. Fairchild, Progress and poverty: An inquiry into color appearance modeling and increase of want with increase of wealth, *IS&T/SID 20th Color and Imaging Conference*, Los Angeles, 155- 157 (2012).

M.D. Fairchild, *Color appearance in displays, etc.*, *RPI-NYSERDA Capturing the Lighting Edge: New Color Metrics Seminar*, Troy, (2012).

M.D. Fairchild, *Color appearance models and complex visual stimuli*, SCAD-10, Newport Beach, (2010).

M.D. Fairchild, *The perceptibility of video artifacts: A perspective from color science*, *5th International Workshop on Video Processing and Quality Metrics (VPQM)*, Scottsdale, Paper 65 (2010).

M.D. Fairchild, Color enhancement panel discussion, *IS&T/SID 17th Color Imaging Conference*, Albuquerque, (2009).

M.D. Fairchild, Twenty-five years of research at the Munsell Color Science Laboratory, *ISCC Annual Meeting - MCSL 25th Anniversary Symposium*, Rochester, (2009).

M.D. Fairchild, High, wide, & deep: Displayed image color appearance and perception, *SID International Symposium*, Los Angeles, 780-782 (2008).



M.D. Fairchild, Beyond the locus of spectrally pure colors, *SPIE/IS&T Electronic Imaging*, San Jose, Proc. SPIE Vol. **6807**, 6800702 (2008).

M.D. Fairchild, A color scientist looks at video, *3rd International Workshop on Video Processing and Quality Metrics (VPQM)*, Scottsdale, Invited Paper 1 (2007).

M.D. Fairchild, Color appearance in image displays, *ISCC/CIE Expert Symposium - 75 Years of the CIE Standard Colorimetric Observer*, Ottawa, (2006).

M.D. Fairchild, Why is Color?: The Color Curiosity Shop, *ISCC Annual Meeting*, Ottawa, (2006).

M.D. Fairchild, Image appearance modeling, *OSA Rochester Section*, Rochester, (2005).

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M.D. Fairchild, Past and Future Evolution of Color Appearance Science and Technology, *Xerox Distinguished Lecture*, Webster, (2004).

M.D. Fairchild, Colour appearance in imaging, *25<sup>th</sup> Session of the CIE*, San Diego, W-9 (2003).

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M.D. Fairchild, Universe-green beige: Sky-blue pink revisited?, *Astronomy Section, Rochester Academy of Science*, Rochester, (2002).

M.D. Fairchild, Image quality measurement and modeling for digital photography, *International Congress on Imaging Science '02*, Tokyo, 318-319 (2002).

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M.D. Fairchild, Status of CIE color appearance models, , *AIC Color 01*, SPIE Vol. 4421, Rochester, 550-553 (2002).

M.D. Fairchild, Just what is a color space?, *Seybold 2001*, Boston (2001).

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## Technical Reports:

M.D. Fairchild, Reversibility of corresponding colors in sensory chromatic adaptation, *Unpublished Complete Report*, <[markfairchild.org/PDFs/PRO54.pdf](http://markfairchild.org/PDFs/PRO54.pdf)> (2022).

R.L. Heckaman and M.D. Fairchild, The Perception of Color as Espoused by Ralph M Evans of The Eastman Kodak Company and Its Extension to What Is Known Now and What Remains to Be Seen, *MCSL Technical Report*, (2004).

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**Community Activities:**

George Eastman House International Museum of Photography and Film, Gallery Docent, 1991-1994

Member: Several Museums, Environmental, Meditative, and Humanistic Organizations.