

Professional Experience

2007–Present

Associate Professor and Chair, BS Motion Picture Science, School of Film and Animation, Rochester Institute of Technology

Responsible for research, curriculum development, teaching, and administration of Motion Picture Science BS degree program. The RIT Motion Picture Science program is one of the first of its kind in the nation, providing a science and engineering education in the fundamental imaging technologies used in the motion picture industry.

- Research interests include multispectral video capture and display, advanced motion image processing, high framerate visual system characterization, color appearance and observer metamerism
- Advisor to undergraduate research work in stereoscopic cinema, high dynamic range imaging, multispectral image capture, advanced cinema color encoding, high framerate visualization and digital cinema workflow engineering
- Designer of applied motion picture engineering curriculum, encompassing topics in production and post-production workflow, film and digital image capture, digital intermediate and digital post-production, video science, color science, digital cinema mastering, cinema optics, imaging physics and digital image processing
- Responsible for administration of the Motion Picture Science program, including academic and advising support for 50 enrolled students

2011–Present

Color Science Consultant

Responsible for digital color management, video processing and image algorithm development for consumer products companies and post-production laboratories

- Implemented display characterization and calibration procedures for high-end home theater systems
- Devised color management strategies and color processing algorithm design for color appearance-based image manipulation
- Provided equipment optimization services for color correction and editing suites in post-production
- Clients have included Entertainment Experience (Rochester, NY), Martino Flynn (Rochester, NY), SpectraCal (Seattle, WA), THX (San Francisco, CA) and NanoLumens (Atlanta, GA)

1998–2007

**Hybrid Imaging Scientist, Entertainment Imaging Division,
Eastman Kodak Company**

Responsible for product research and development and systems integration for motion picture imaging products used in theatrical feature film and television markets

- Color science modeling and simulation for optical and digital motion picture imaging systems
- Workflow and system design for television post-production and digital intermediate technologies
- Psychophysical image perception modeling and theory development
- Photographic materials design and specification
- Color negative motion picture film design and commercialization
 - Kodak Ektachrome 100D Color Reversal Motion Picture Film
 - Kodak Vision2 500T Color Negative Motion Picture Film
 - Kodak Vision2 HD Color Negative Motion Picture Film
- Imaging software and component firmware design and commercialization
- Image science support and technical resource for television/feature film post-production facilities
- Analysis and evaluation toolset development for photographic laboratory measurements
- Image quality evaluation for various optical and digital motion picture imaging systems
- Customer research on prototype products and system concepts
- Customer introduction and training for new photographic materials and digital/hybrid imaging systems

1997-1998

**Process Development Engineer, Manufacturing Research
Engineering Organization, Eastman Kodak Company**

Responsible for development projects on pilot-scale solvent cast machine in support of cellulose acetate polymer thin film manufacturing operations

- Manufacturing process research
- 6-sigma process characterization and control implementation
- Taguchi robust process design

1996

**Process Development Engineering Intern, Polymer
Processing Unit, Eastman Chemical Company**

Charged with process improvement projects in polyethylene production facility

- Statistical process control
- Physical process design and implementation

Education

2015

PhD – Color Science, Rochester Institute of Technology

- Program of Color Science and Munsell Color Science Laboratory at RIT studying under Dr. Mark D. Fairchild
- Research emphasis in color modeling, multispectral video capture and display, color appearance and observer metamerism
- Dissertation: “Expanding Dimensionality in Cinema Color: Impacting Observer Metamerism through Multiprimary Display”

2001

MS – Materials Science, University of Rochester

- Emphasis on optics and semiconductor technologies
- Thesis: “The Influence of Formulation and Emulsion Morphology on Special Effects Fringing Performance in Color Photographic Films”

1999

Image Science Career Development Program, Eastman Kodak Company

- Intensive image science training curriculum operated in collaboration with Rochester Institute of Technology
- 2-year internal program with emphasis on image science, color science, image quality, system design, and manufacturing technologies

1997

BS – Chemical Engineering, University of Texas at Austin

- Highest Honors, GPA 4.0/4.0
- Rase Brothers Award for Outstanding Chemical Engineering Student
- Eastman Scholar, National Merit Scholar, UT Presidential Endowed Scholar

Selected Publications

“Expanding Dimensionality in Cinema Color: Impacting Observer Metamerism through Multiprimary Display,” *Ph.D. Dissertation*, Rochester Institute of Technology 2015

“Observer Metamerism Models and Multiprimary Display Systems,” *Proc. SMPTE Annual Technology Conference*, Hollywood, CA, October 2015

“The Calibration Conundrum: Towards Standardizing a Reference White Chromaticity for HDTV,” *Proc. SMPTE Annual Technology Conference*, Hollywood, CA, October 2015

“Reducing Observer Metamerism in Wide-gamut Multiprimary Displays,” *Proc. Human Vision and Electronic Imaging*, San Francisco, CA, February 2015

“Modeling Observer Variability and Metamerism Failure in Electronic Color Displays,” *Journal of Imaging Science and Technology*, Vol. 58, Issue 3, November 2014

“Motion Picture Science: A Fully Integrated Fine Arts/STEM Degree Program,” *Proc. IEEE Integrated STEM Education Conference*, March 2014

“Towards Higher Dimensionality in Cinema Color: Multispectral Video Systems,” *Motion Imaging Journal*, April 2013

“Optimizing Spectral Color Reproduction in Multiprimary Digital Projection,” *Proc. Color Imaging Conference 19*, San Jose, CA, November 2011

“Designing Camera Origination Films for Scan-Only Applications in Television and Digital Intermediate,” *Motion Imaging Journal*, April 2006

“A New Color Negative Film for the Digital Future,” *Motion Imaging Journal*, October/November 2004

“The Technology of Enhanced Color Saturation: Kodak Ektachrome 100D Color Reversal Film/5285,” *Motion Imaging Journal*, April 2001

“The Influence of Formulation and Emulsion Morphology on Special Effects Fringing Performance in Color Photographic Films,” *Masters Thesis*, University of Rochester 2001

Selected Talks

“Observer Metamerism Models and Multiprimary Display Systems,” *Society of Motion Picture and Television Engineers Technical Conference*, Hollywood, CA (2015)

“Navigating Big Color,” *Technology Summit on Cinema at NAB2015*, Las Vegas, NV (2015)

“Reducing Observer Metamerism in Wide-gamut Multiprimary Displays,” *Human Vision and Electronic Imaging*, San Francisco, CA (2015)

“Digital Color Management for Television and Movies,” Invited Lecture, *Color Imaging Conference 22*, Boston, MA (2014)

“Modeling Observer Variability and Metamerism Failure in Electronic Color Displays,” *Color Imaging Conference 22*, Boston, MA (2014)

“Multispectral Digital Projection,” *Rochester Institute of Technology College of Imaging Arts and Sciences Research Symposium*, Rochester, NY (2014)

“Towards Higher Dimensionality in Cinema Color: Multispectral Video Systems,” *Society of Motion Picture and Television Engineers Technical Conference*, Hollywood, CA (2012)

“Multispectral Video Capture,” *National Association of Broadcasters Trade Show*, Las Vegas, NV (2012)

“Video Science Fundamentals,” Invited Lecture, *Selznick School of Film Preservation, George Eastman House*, Rochester NY (2012-2015)

“Optimizing Spectral Color Reproduction in Multiprimary Digital Projection,” *Color Imaging Conference 19*, San Jose, CA (2011)

“Multispectral Video Display and Observer Metamerism,” *National Association of Broadcasters Trade Show*, Las Vegas, NV (2011)

“Vision2 Color Negative Film and the Academy Award,” *Imagine RIT*, Rochester, NY (2008)

“Designing Camera Origination Films for Scan-Only Applications in Television and Digital Intermediate,” *Society of Motion Picture and Television Engineers Technical Conference*, Hollywood CA (2005)

“A New Color Negative Film for the Digital Future,” *Society of Motion Picture and Television Engineers Technical Conference*, Hollywood, CA (2003)

“The Technology of Enhanced Color Saturation: Kodak Ektachrome 100D Color Reversal Film/5285,” *Society of Motion Picture and Television Engineers Technical Conference*, Pasadena, CA (2000)

Quoted

Enlisted as subject matter expert in pre-trial deposition during patent infringement case, Color LUT video processing, July 2014

“Cinema last to switch to digital projectors,” *Rochester Democrat & Chronicle*, May 9, 2014 – quoted as subject matter expert

“V for Vitality,” topics on innovation and the arts - guest on internet radio program hosted by Susan Brender, womensradio.com, June 19, 2013

“Indie film is last gasp for Kodak’s Plus-X film,” *Rochester Democrat & Chronicle*, June 19, 2012 – quoted as subject matter expert

“Sustaining an Industry,” *RIT Reporter*, February 17, 2012 – quoted as Motion Picture Science program chair

“Rochester After Kodak’s Bankruptcy,” *RIT Reporter*, February 3, 2012 – quoted as subject matter expert

Enlisted as subject matter expert in pre-trial deposition during patent infringement case, anti-piracy techniques in motion picture theatrical exhibition, November 2011

“Motion Picture Science,” *Research at RIT*, Spring/Summer 2011 – quoted as Motion Picture Science program chair

“Long wins coveted Oscar,” *RIT News & Events*, February 21, 2008 – quoted as award recipient

“Kodak to take home its 9th Oscar,” *Rochester Democrat & Chronicle*, January 12, 2008 – quoted as award recipient

“Kodak rolls out new film: Vision3,” *Rochester Democrat & Chronicle*, November 30, 2007 – quoted as subject matter expert

Awards

2015 Kodak Education Medal, *Society of Motion Picture and Television Engineers*

2008 Scientific-Technical Academy Award – Vision2 Color Negative Films
Academy of Motion Picture Arts and Sciences

“Designing Camera Origination Films for Scan-Only Applications in Television and Digital Intermediate,” *Society of Motion Picture and Television Engineers Journal*, April 2006 – received 2007 SMPTE Journal Award for Outstanding Article

Kodak Vision2 HD Color Negative Film System - International Broadcasting Consortium Outstanding New Technology, Runner-up award for best new motion imaging technology presented at International Broadcasting Conference, Amsterdam, 2006

Viper Color Negative Film Development, Outstanding Kodak Research Team, internal Eastman Kodak award, 2002

Patents

“Wide Gamut Film System for Motion Image Capture,” *U.S. Patent Pending*

“System and Method for Processing Images to Emulate Film Tonescale and Color,” *US Patent 7,274,428*

“System and Method for Processing Electronically Captured Images to Emulate Film Tonescale and Color,” *US Patent 7,327,382*

Professional Service

Society of Motion Picture & Television Engineers

Rochester Section Secretary/Treasurer: 2008-2009 & 2010-present

Rochester Section Chair: 2009-2010

National SMPTE Education Advisory Committee Member: 2010-present

RIT SMPTE Student Chapter Advisor: 2012-present

Academy of Motion Pictures Arts & Sciences

Academy Color Encoding System Contributor: 2009-present

Little Theatre Advisory Board, Rochester, NY

Chair: 2011-present

Member: 2008-2010