EI25: Color Optimization for Displays
Sunday January 13, 2019, 10:15 am – 12:15 pm
Course Length: 2 hours
Course Level: Intermediate
Instructor: Gabriel Marcu, Apple Inc.
Fee*: Member: $185 / **Non-member:** $210 / **Student:** $65
*after December 18, 2019, members / non-members prices increase by $50, student price increases by $20

This course introduces color optimization techniques for various display types (LCDs, plasma, OLED, QLED, and projection: DLP, LCD, LcoS), and ranging from mobile devices to large LCD TV screens. Factors such as technology, luminance level (including HDR), dynamic/static contrast ratio (including local dimming), linearization and gamma correction, gray tracking, color gamut (including wide gamut), white point, response time, viewing angle, uniformity, color model, calibration, and characterization are discussed and color optimization methods for displays are presented.

Learning Outcomes
- Identify the critical parameters and their impact on display color quality for various display types (LCD, plasma, OLED, QLED) and applications (smartphones, tablets, notebooks, desktops, TVs, and projectors).
- Select the optimal color model for a display and highlight its dependency on display technology.
- Understand the advantages of the LED backlight modulation and the principles of quantum dot gamut enhancement for QLED technology.
- Understand the critical factors for HDR displays and wide gamut displays.
- Compare color performance and limitations for various LCD modes like IPS, MVA, FFS.
- Understand the use of the color model for the display ICC profile and the implication for the color management.
- Follow a live calibration and characterization of an LCD screen and projector used in the class, using tools varying from visual calibrator to instrument based ones.
- Apply the knowledge from the course to practical problems of color optimization for displays.

Intended Audience
Engineers, scientists, managers, pre-press professionals, and those confronting display related color issues.

Instructor
Gabriel Marcu is senior scientist at Apple Inc. His achievements are in color reproduction on displays and desktop printing (characterization/calibration, halftoning, gamut mapping, ICC profiling, HDR imaging, RAW color conversion). He holds more than 80 issued patents in these areas. Marcu is responsible for color calibration and characterization of Apple desktop display products. He has taught seminars and courses on color topics at various IS&T, SPIE, and SID conferences and IMI Europe. He was co-chair of the 2006 SPIE/IS&T Electronic Imaging Symposium and of CIC11; he is co-chair of the Electronic Imaging Symposium's Color Imaging Conference: Displaying, Hardcopy, Processing, and Applications. Marcu is an IS&T and SPIE Fellow.