

Designer's Lighting Forum

THE FUTURE'S SO BRIGHT YA GOTTA WEAR SHADES  
OR  
LIFE'S TOO SHORT FOR STATIC COLOR

**Adam Carangi**

Architectural Design Director  
Lumenetix

**Steven Rosen, FIALD, IES**

President & Creative Director  
Available Light



 LEDucation®

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Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.



# Learning Objectives

At the end of the this course, participants will be able to:

- 1) Review how designers are inspired by and employ color/color temperature throughout design in various mediums, and how great design, when present, is never static.
- 2) Explore how tunable light technology expands opportunities for achieving aesthetically unique design, redefining that 'really cool' light source.
- 3) Demonstrate the steps to conceptualize, specify, and execute a design with tunable color influenced by the building blocks of design to suit practical applications.
- 4) By helping them to appreciate how to meld art and science, instill confidence for lighting professionals to be bold leaders in the future of digital lighting technology.



J'ai fait un très bon voyage  
je vous aurais déjà écrit  
plus tôt, mais j'ai  
travaillé j'ai

que sur  
réservé à  
responsabilité

# CARTE POSTALE

PARIS XVIII  
19 \*  
24

Les pays étrangers n'acceptent pas la correspondance au recto (Se reporter à la Poste)  
CORRESPONDANCE

De Paris je  
vous envoie un  
affectueux bonjour  
M. Anglade

Demoiselle Y. Ponce  
rue des Hospices  
Lermont. Terra



meurs se font  
pour vous. A bientôt  
Chères. A. Bientôt  
Camille

Paris  
Yun

Je t'embrasse



# Tempo • Timbre • Texture • Volume





Architecture



Museums



Corporate Theater

Movement Angle  
Intensity Composition **Contrast** Color  
Motivation Mood  
**Rhythm** **Accenting** **Layers**  
Visibility **Dynamic**

Building Blocks of a Lighting Design



Contrast...

Contrast...

**Contrast!**



Layers of Light

*Our Town on Broadway*



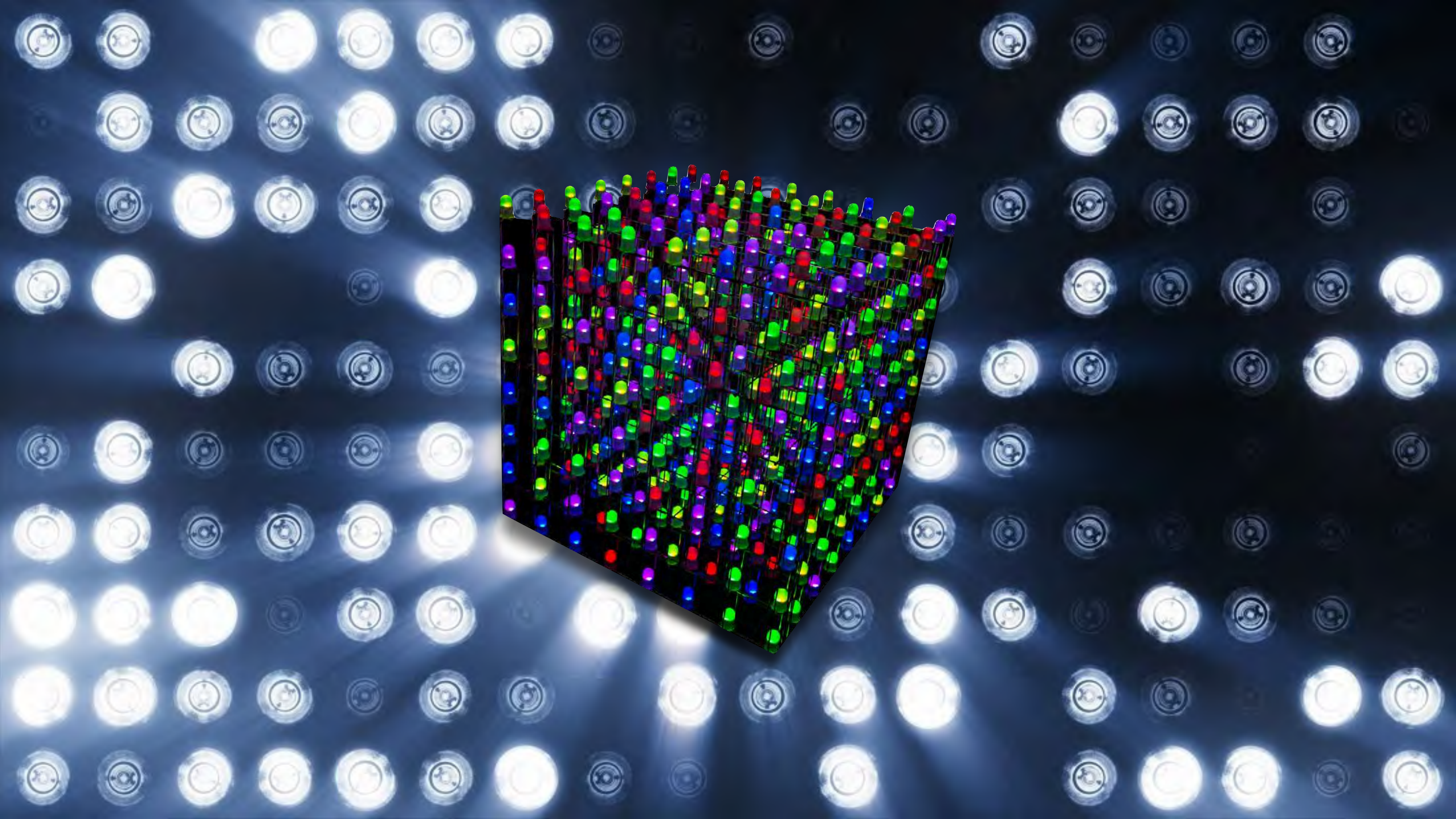
Layers of Light

White House Visitor's Center • Available Light



Hierarchy

*Boris Godunov at the Met, Lighting by Duane Schuler*



# Biophilia



# Biophilia



Benefits of Tuneable/Dynamic Light

# Biophilia



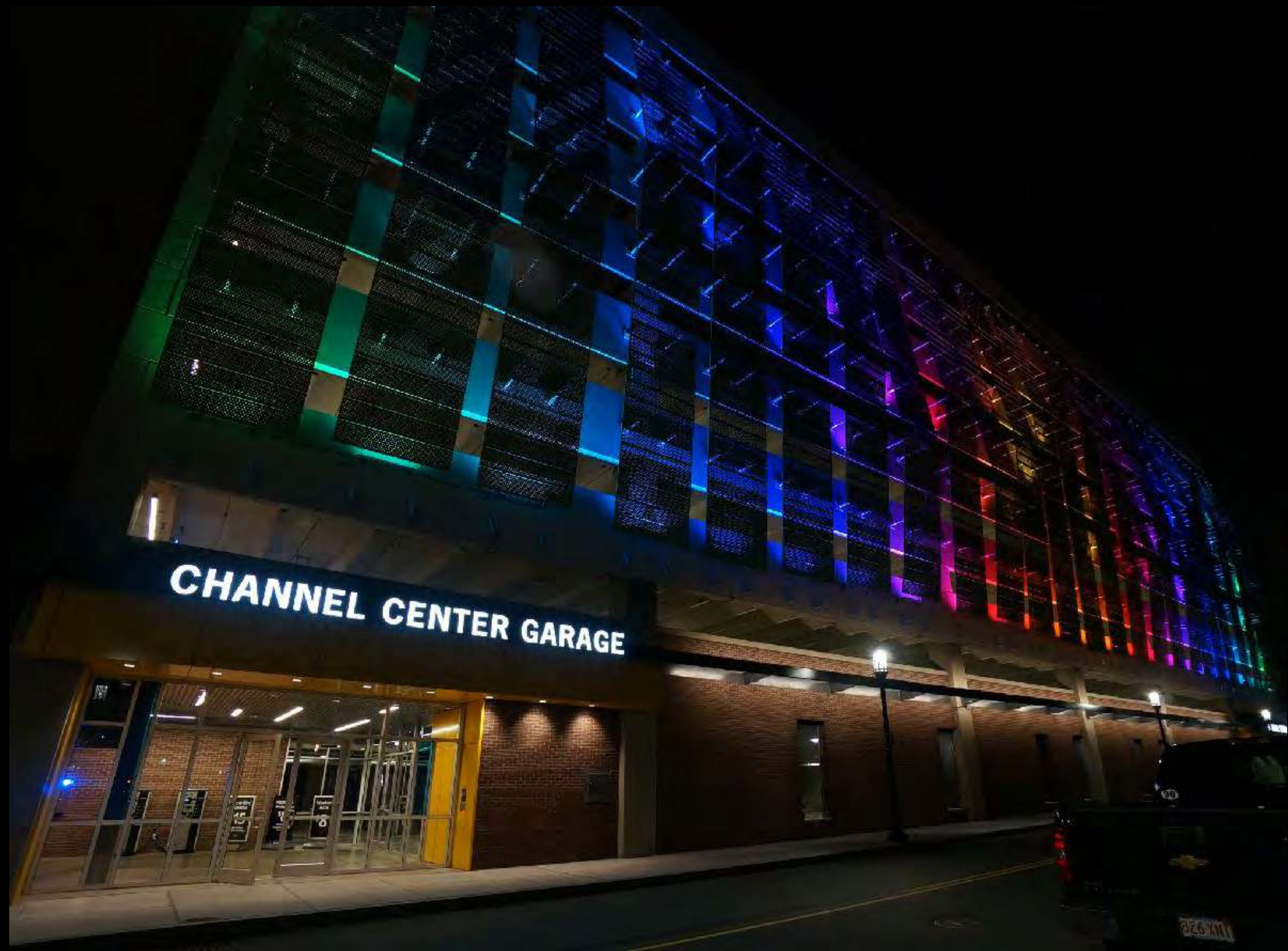
- Mood/Behavior
- Concentration
- Quality of Life

Benefits of Tuneable/Dynamic Light





Neural Climber • Franklin Institute



Light & Pixel Mapping Merge

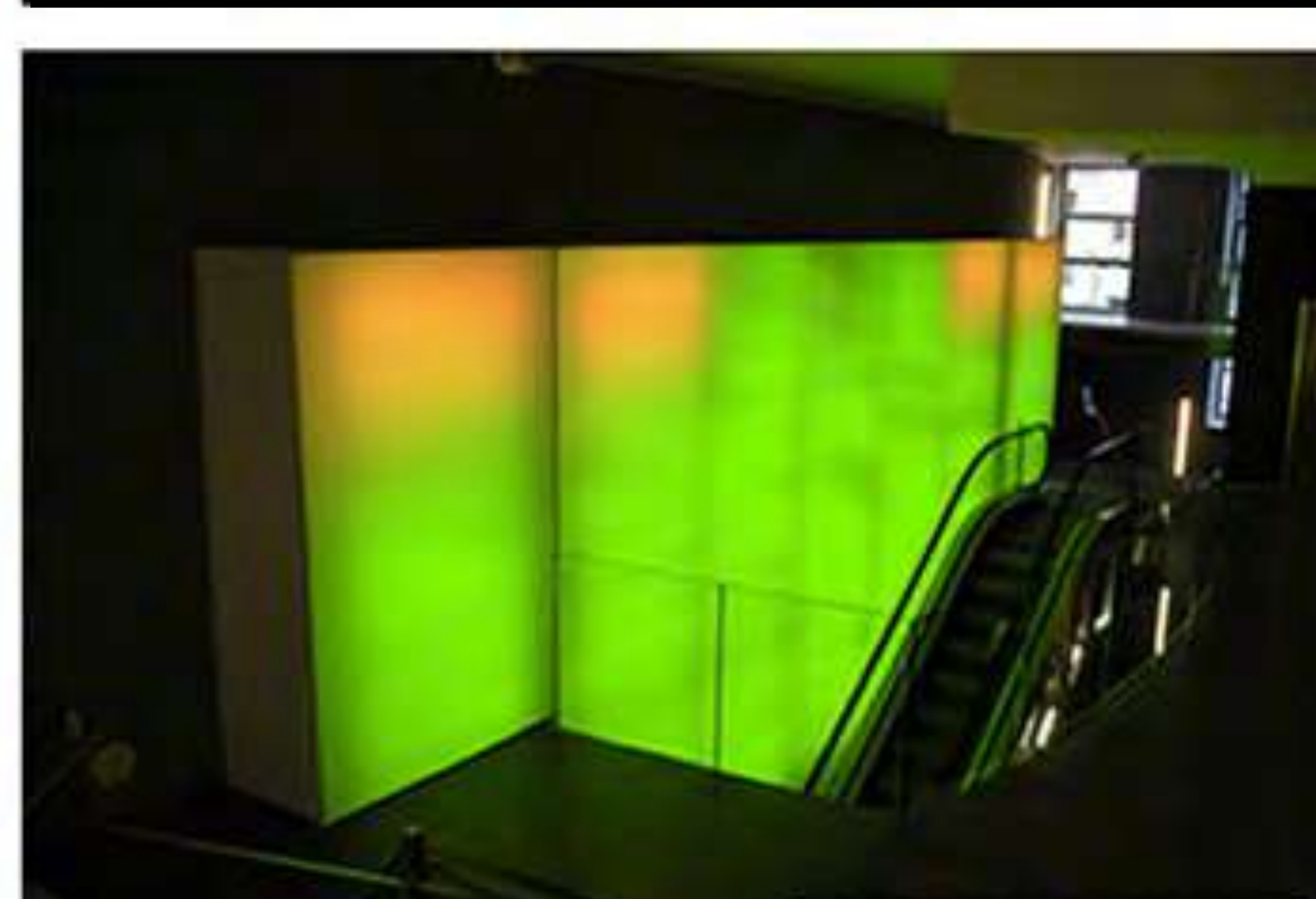


177 Huntington Avenue



What is White Light?

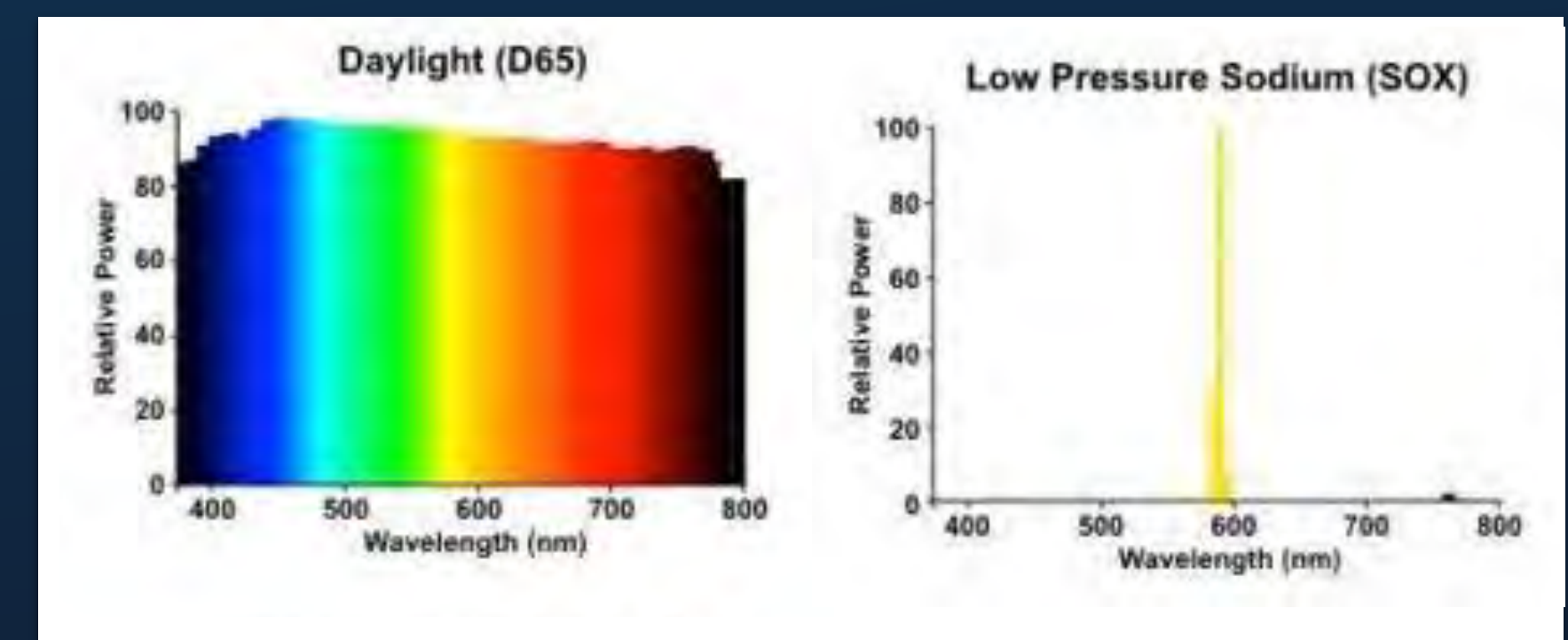




Intersection of Light & Architecture



Physics & Art • *The Weather Project*



Physics & Art • *The Weather Project*



# Fantastical World meets The Real World



*Rendering*



Image

Mann Center for the Performing Arts

# Fantastical World meets The Real World



Pennsylvania 9-11 Memorial



LUX Lounge



LIFE Center



Agnes Irwin School



Bungalow Hotel

# The Big, Colorful Picture

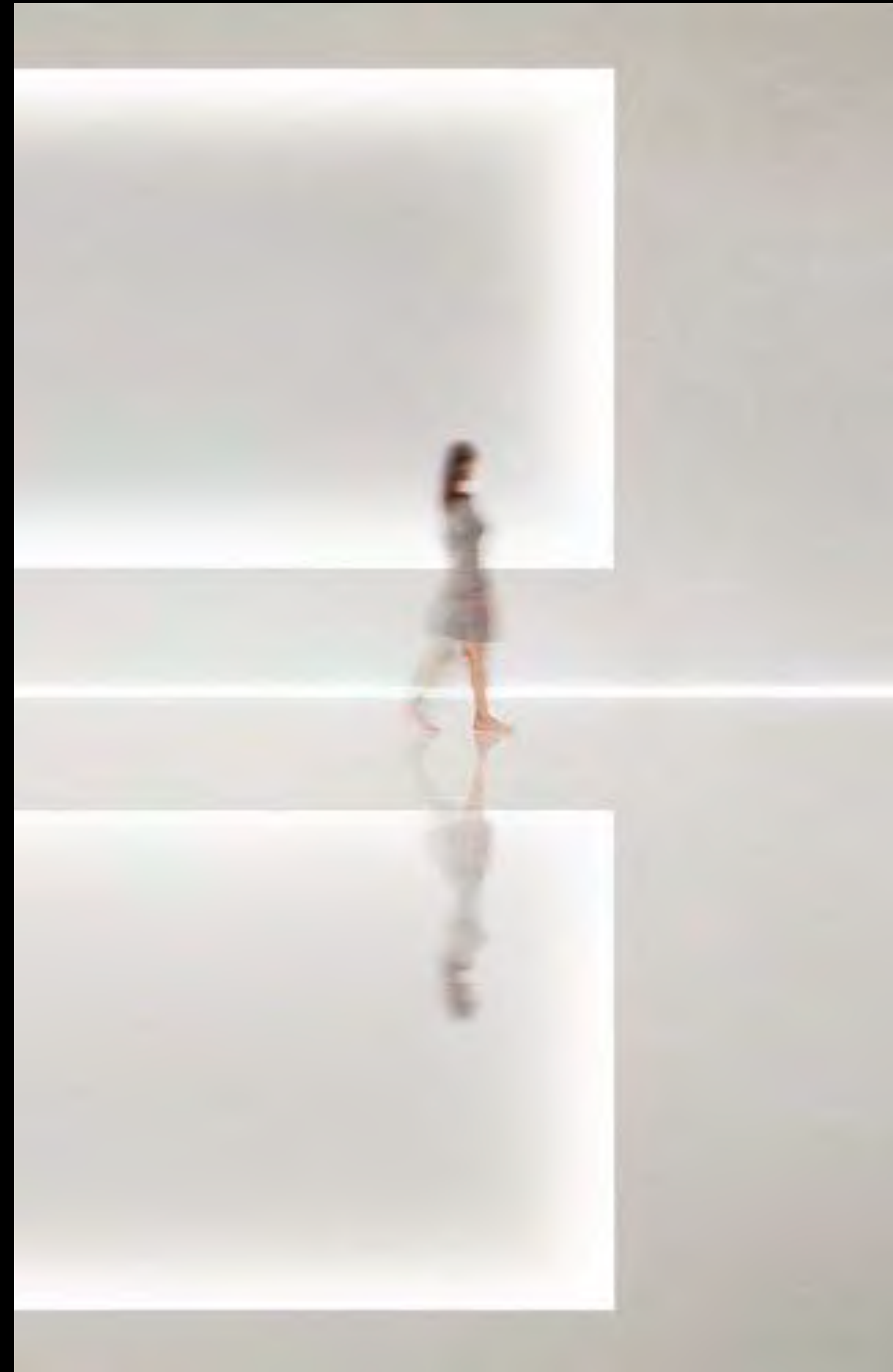
1. Evolving methods to control light and spectrum.
2. Solve new challenges with known skills.
3. Scale your lighting and controls to the task.

# The Big, Colorful Picture

1. Change is coming
2. Don't Panic.
3. Keep it (relatively) simple.

# In The Beginning...

There was white



KGM Architectural Lighting

# Specific White

“All lamps shall be  
3500K CCT, by same  
manufacturer...”



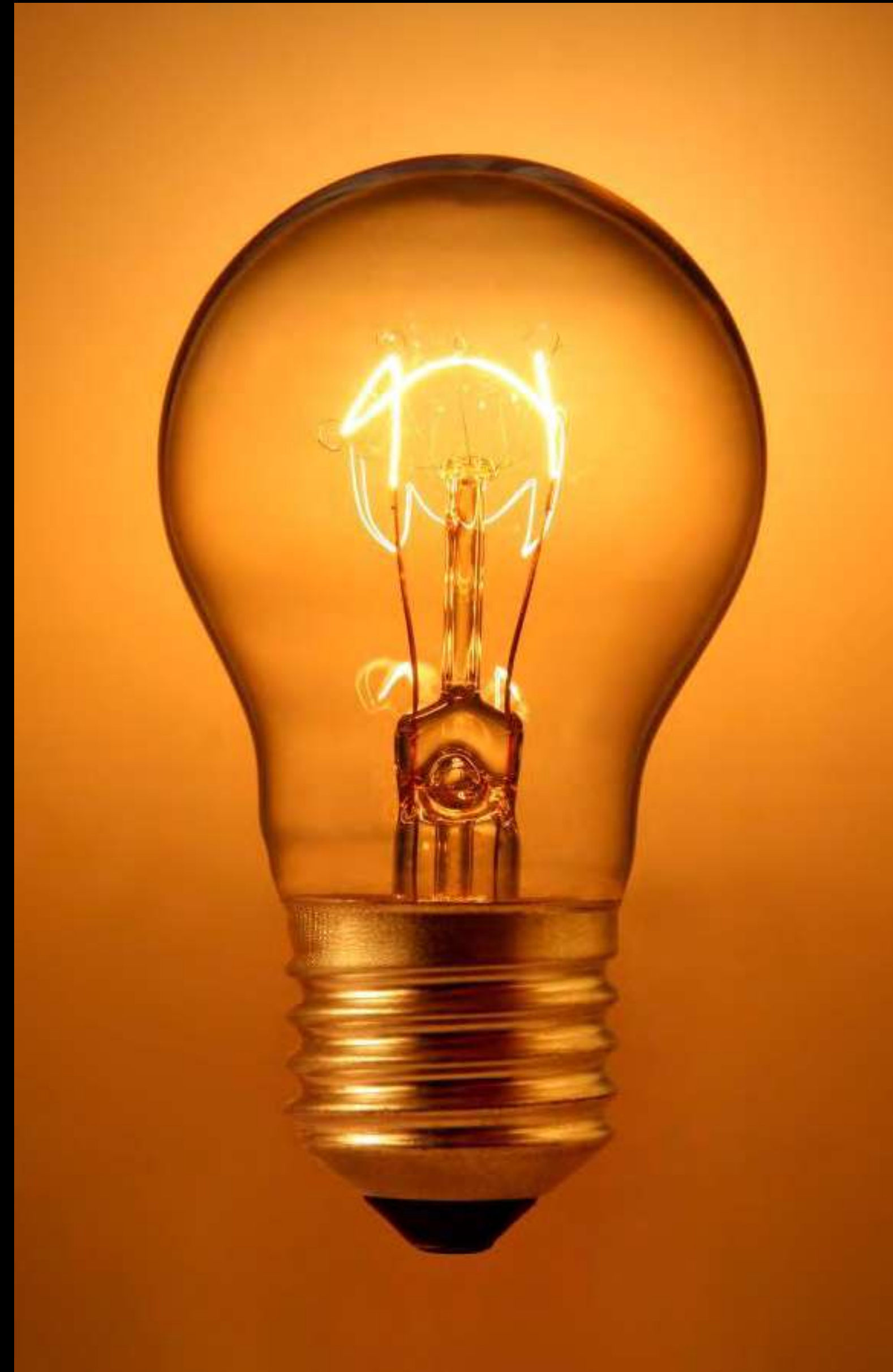
# Unspecific White

Tunable sources are an  
antidote to a major  
maintenance challenge



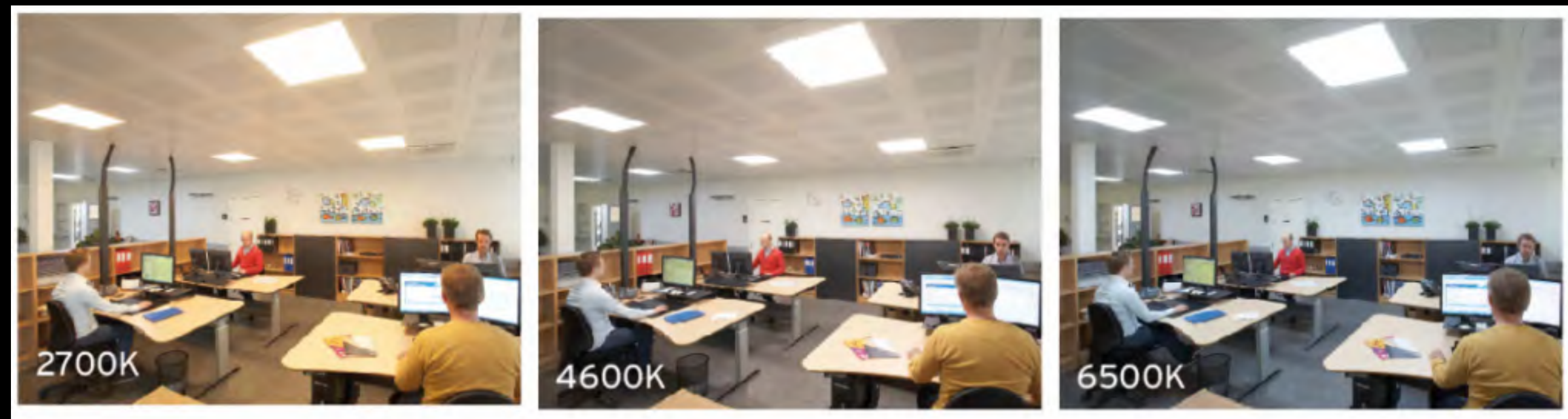
# Controlled White

We've all 'tuned' white...





# Controlled White



Familiar Patterns

# Specific Color

Color is is nothing new  
to our design palette...  
...as a dedicated choice.



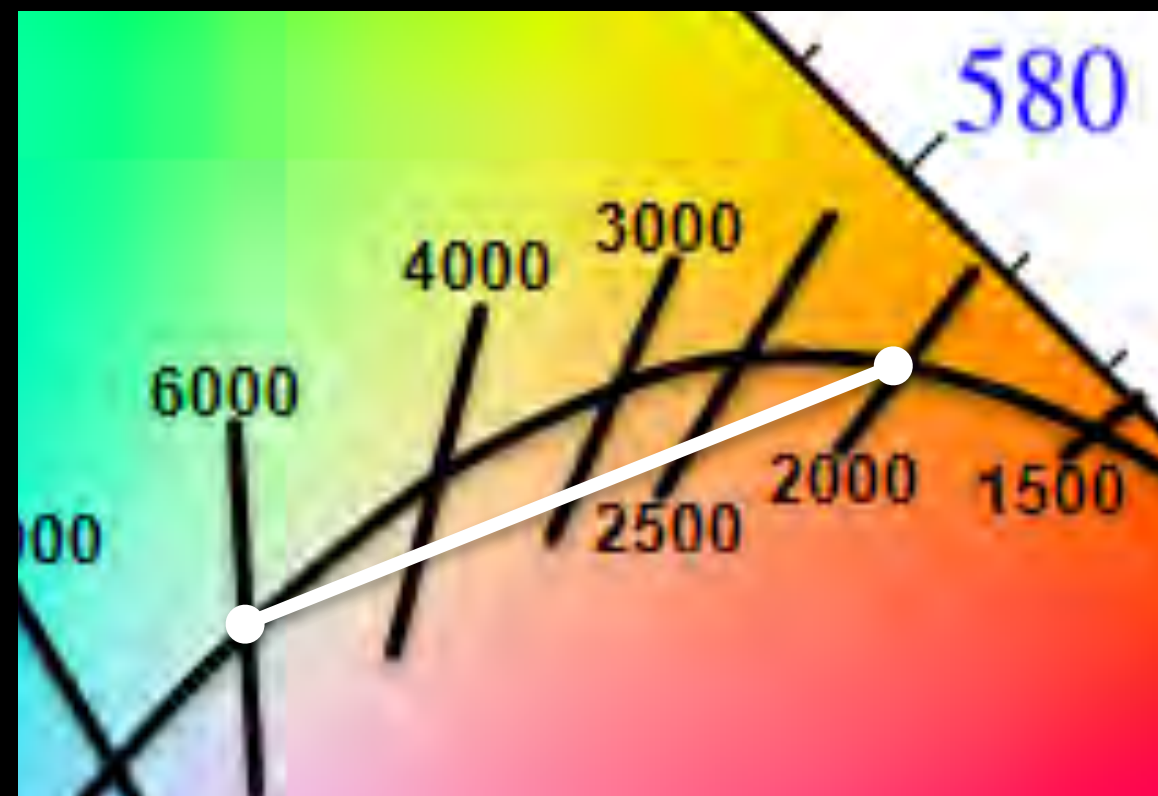
LEE Filters

# Then came RGB

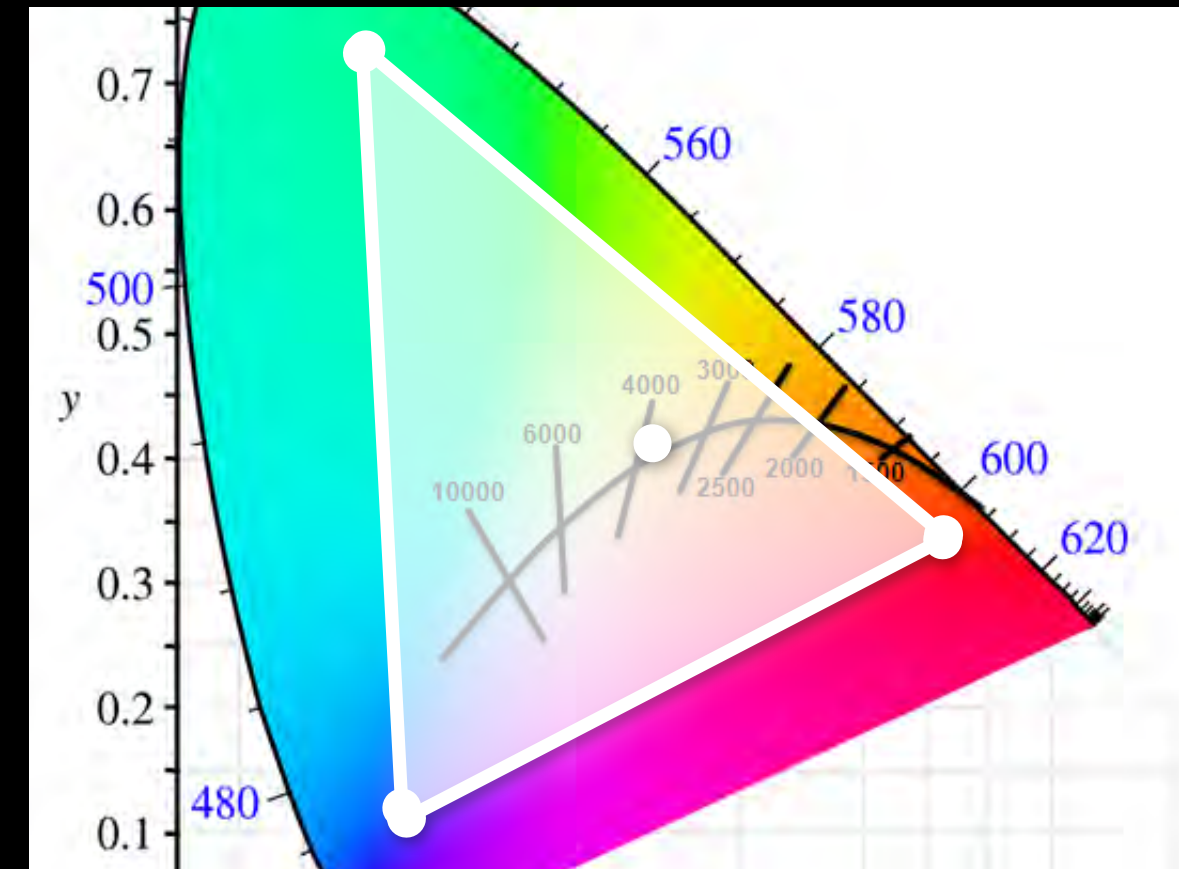


Color! Everywhere!! Why not???

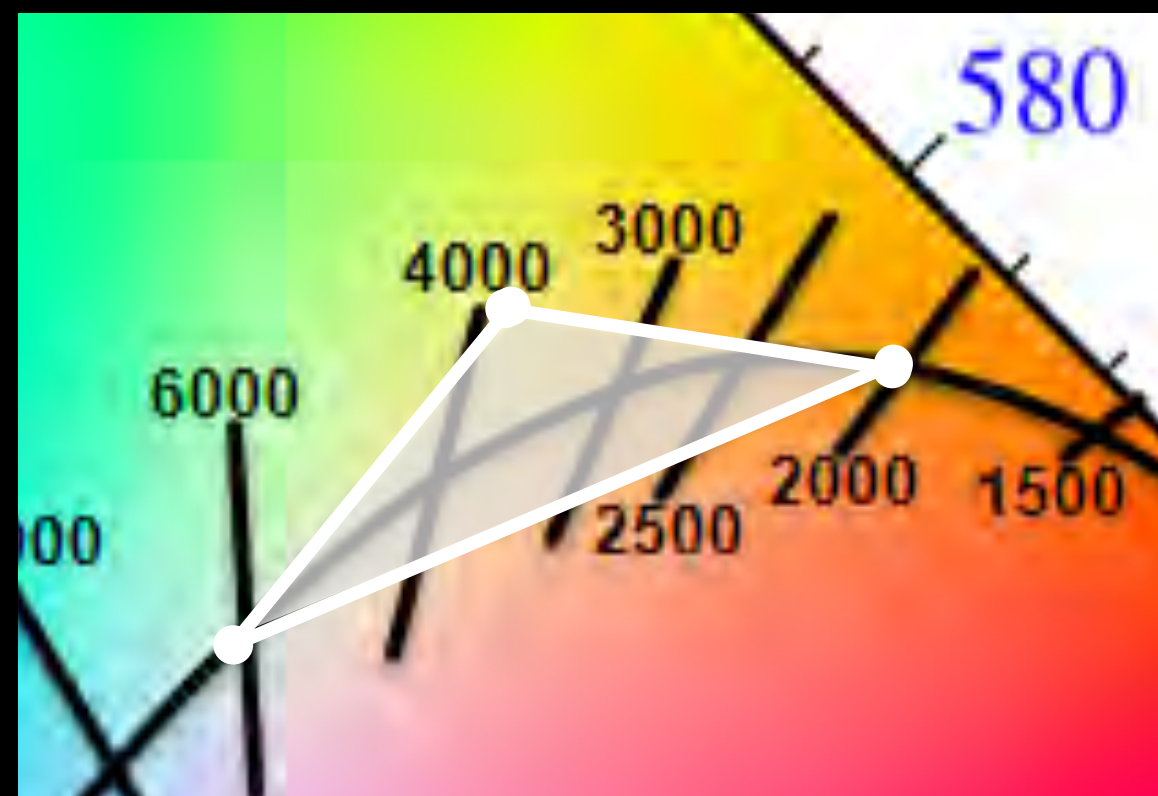
# Levels of Color Control



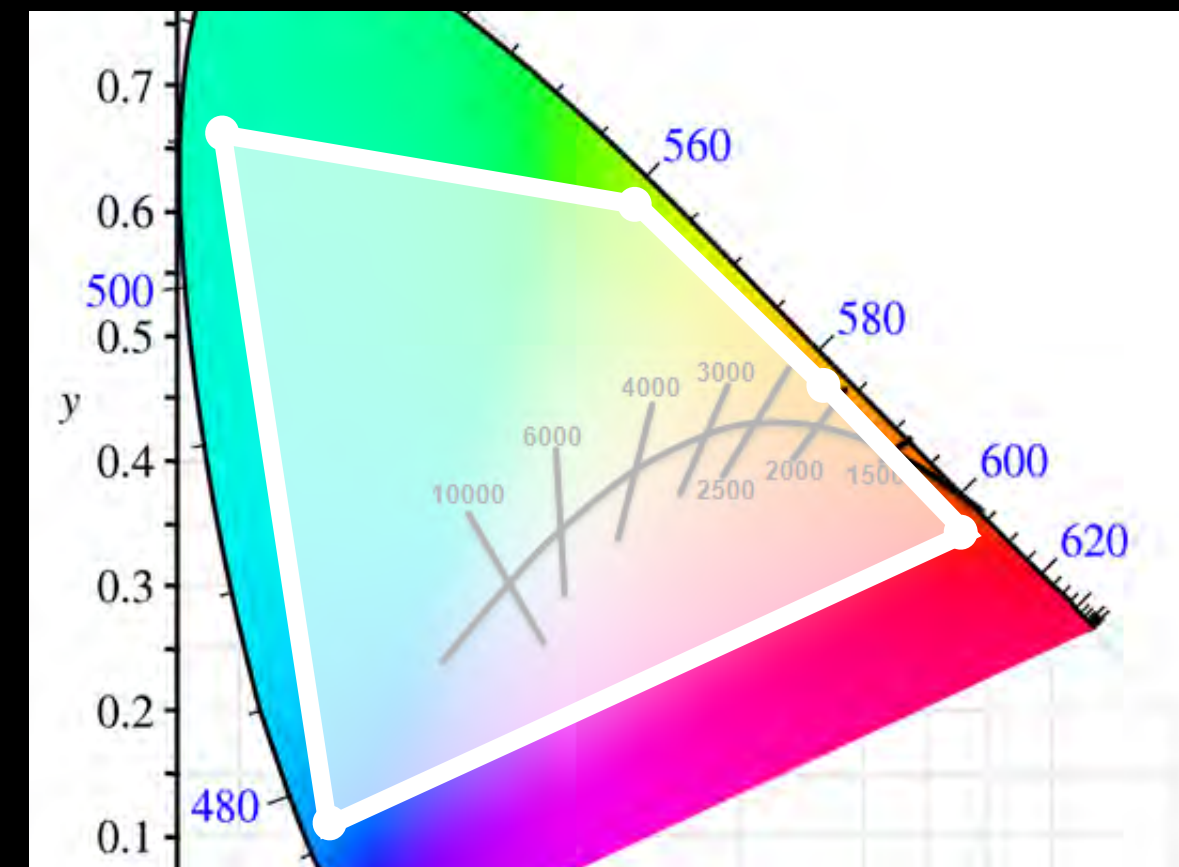
**Binary White**



**Color Changing**



**Tunable White  
(and dim-to-warm)**



**Tunable Color**

# Where?



# Branding

# Where?



# Retail

# Where?



# Classrooms

# Where?



# Healthcare



# Where?



# Office space

# Where?



Residential

# Control Strategies

# This is not rocket science



**Pull the leeeever!!!**



# Leeevers

- Intensity
- Color - Manual or HSI
- Color Fidelity/Gamut
- Melanopic Lux
- Inputs from Environment:
  - Time of day
  - Occupancy
  - State of building system



# Control

- These are all leeeevers in different packages.
- Choose the package best for the overall project.
- Avoid color controls that dictate a package to the overall project.
- Digital is better.

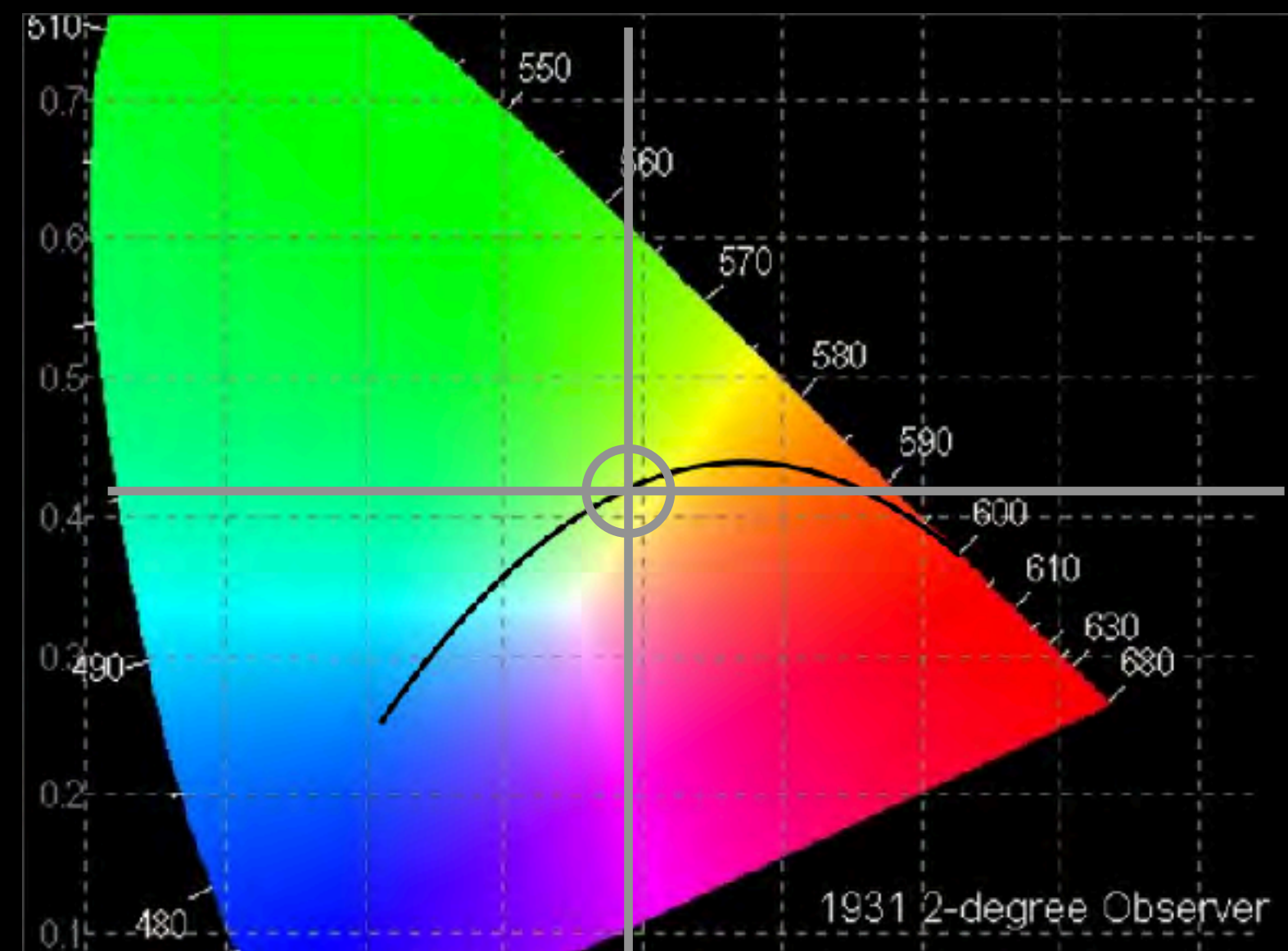


# Consider the Mix

Control BY Color  
or  
Control TO Color



3-color mix

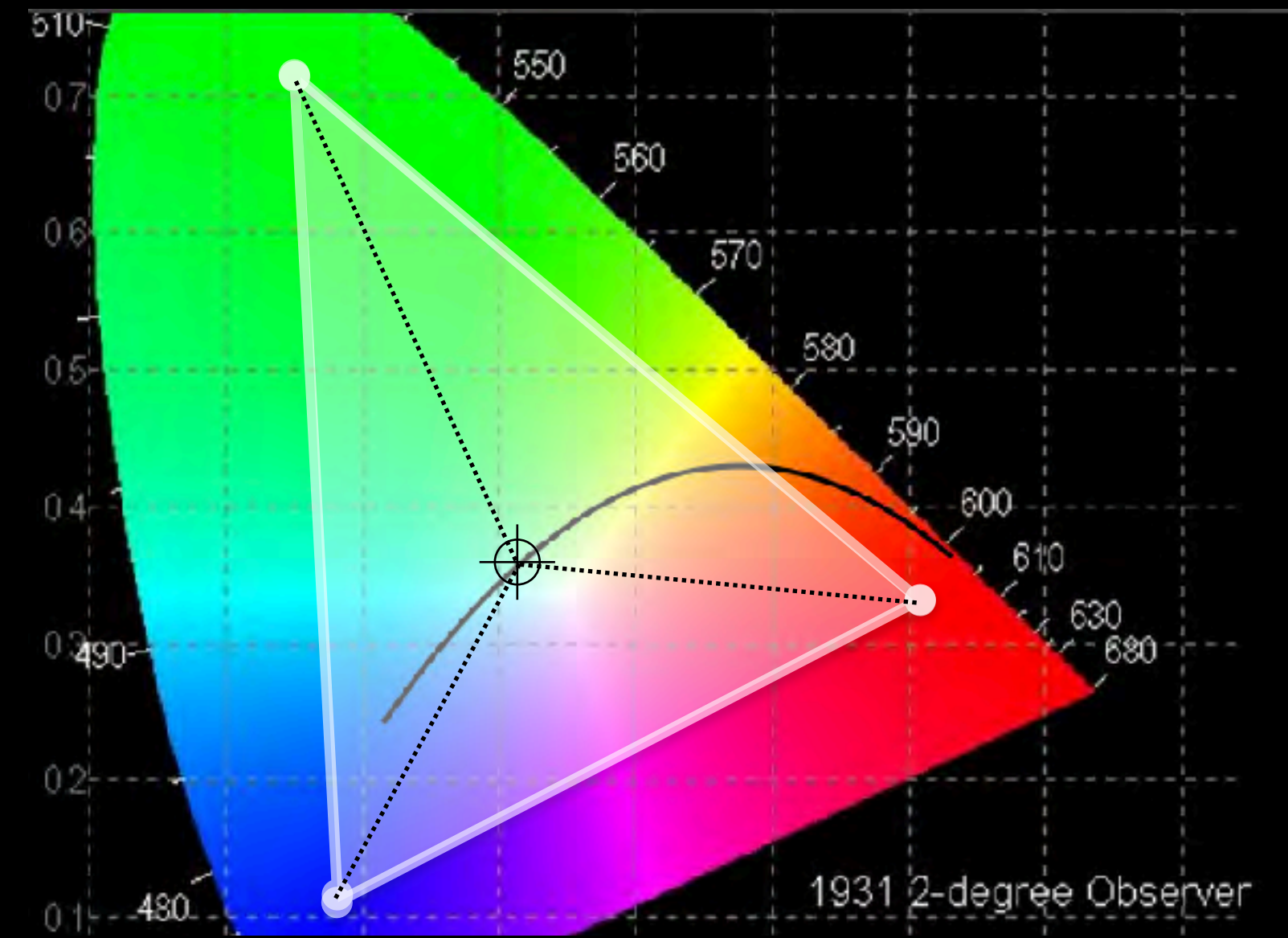


5-color mix

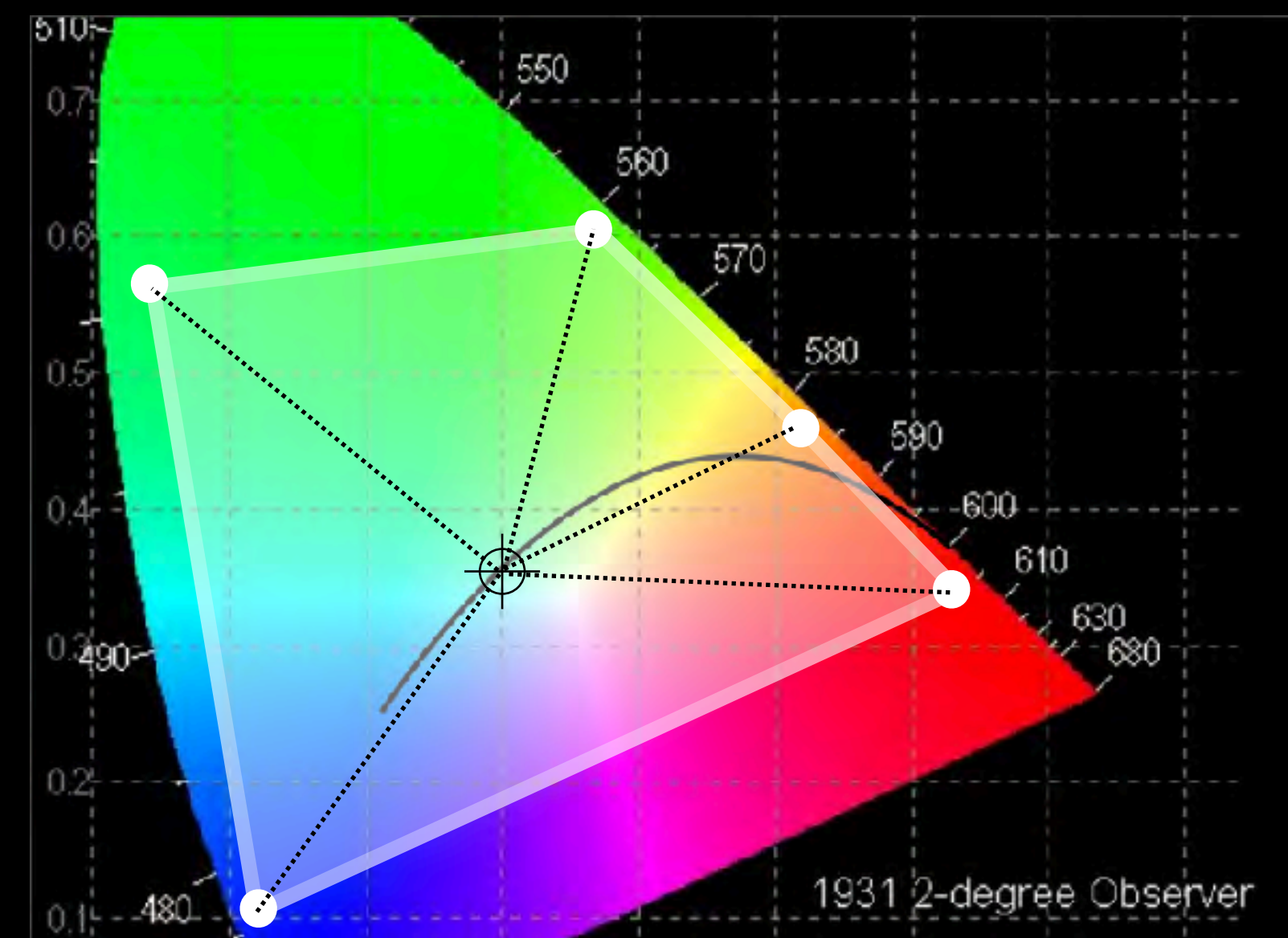


# Hitting the Target

Balance intensity of  
each color point



**3-color mix**

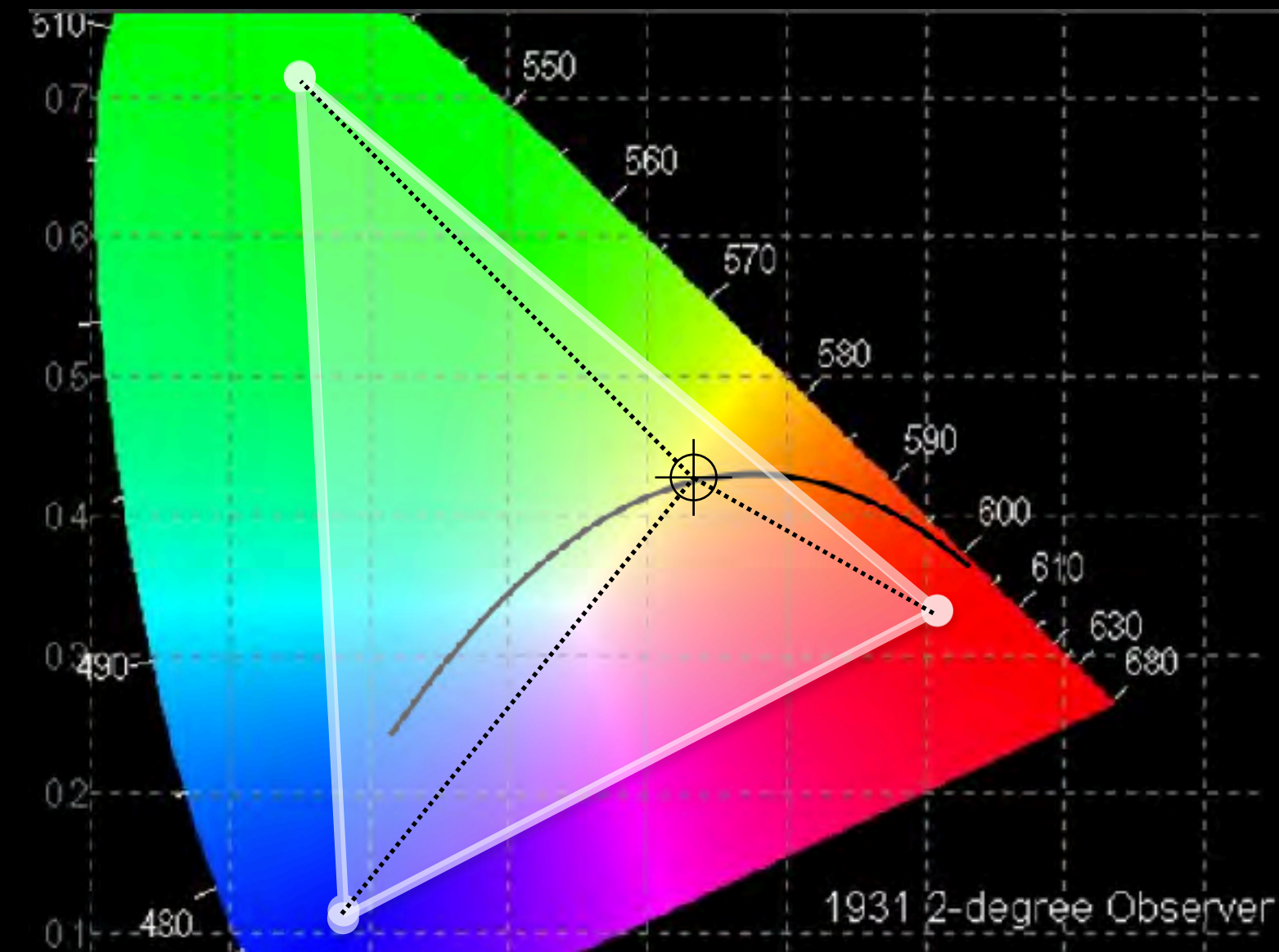


**5-color mix**

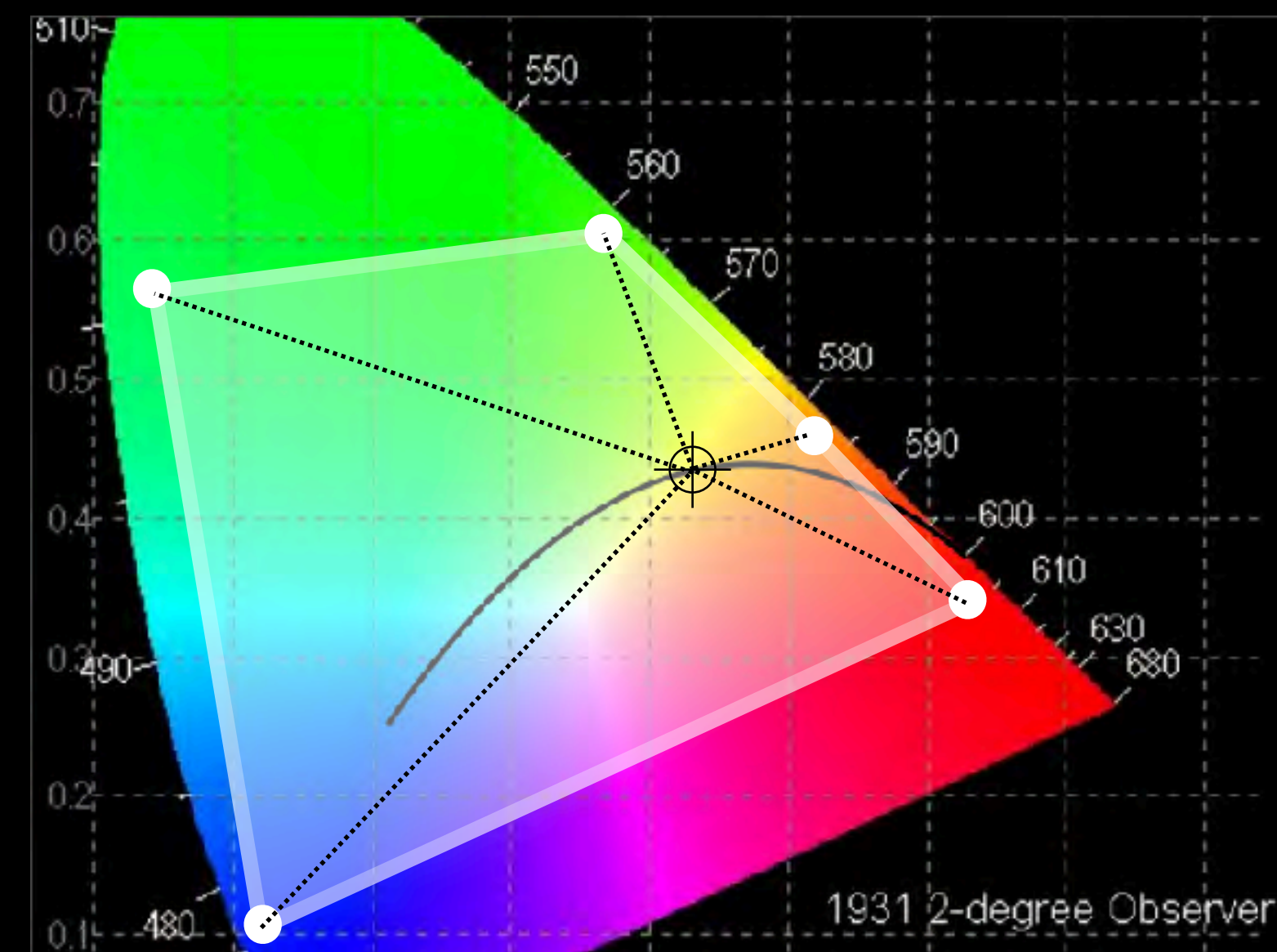
# Hitting the Target

Balance intensity of  
each color point

...and keep overall  
intensity stable

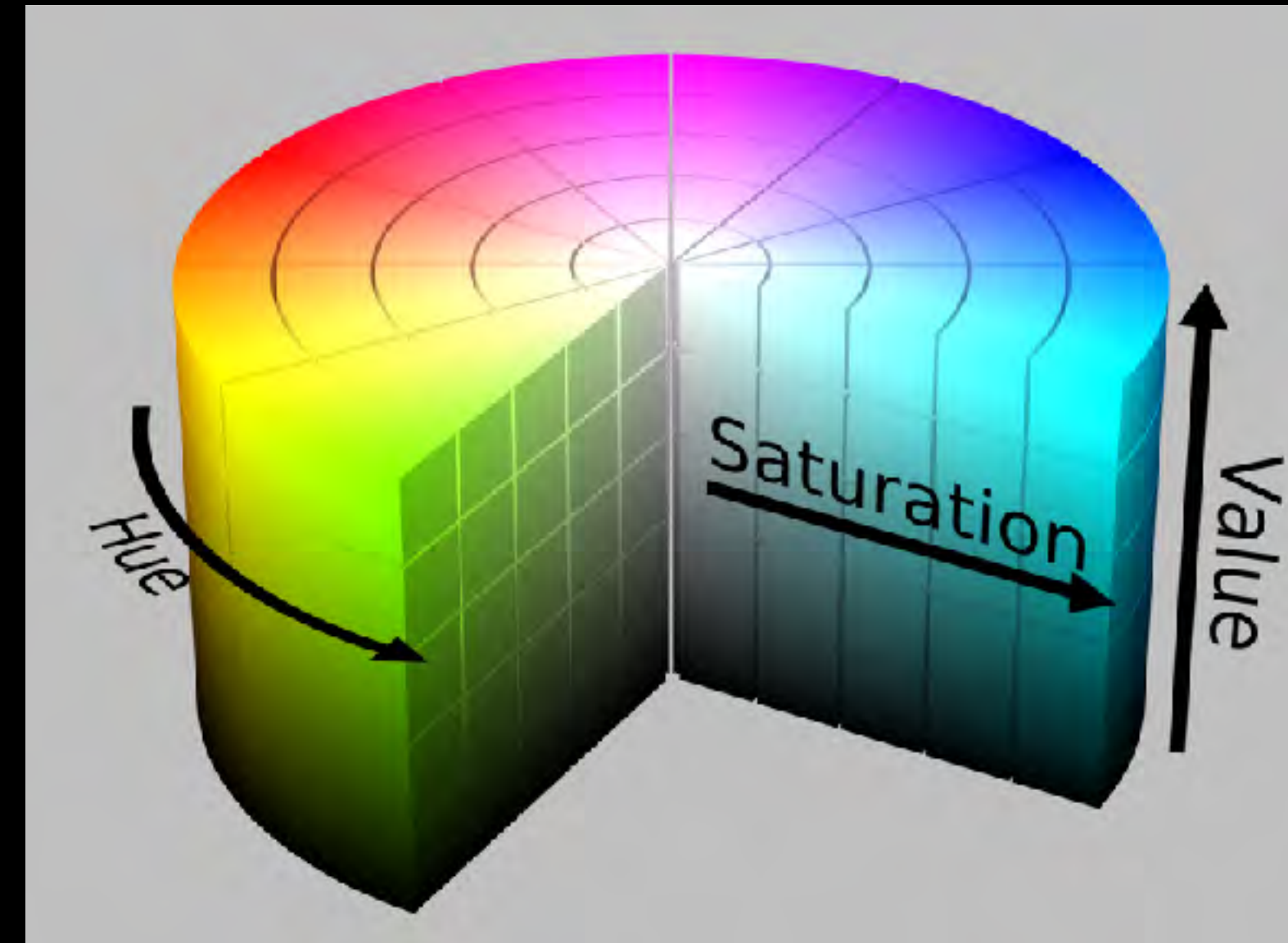


**3-color mix**

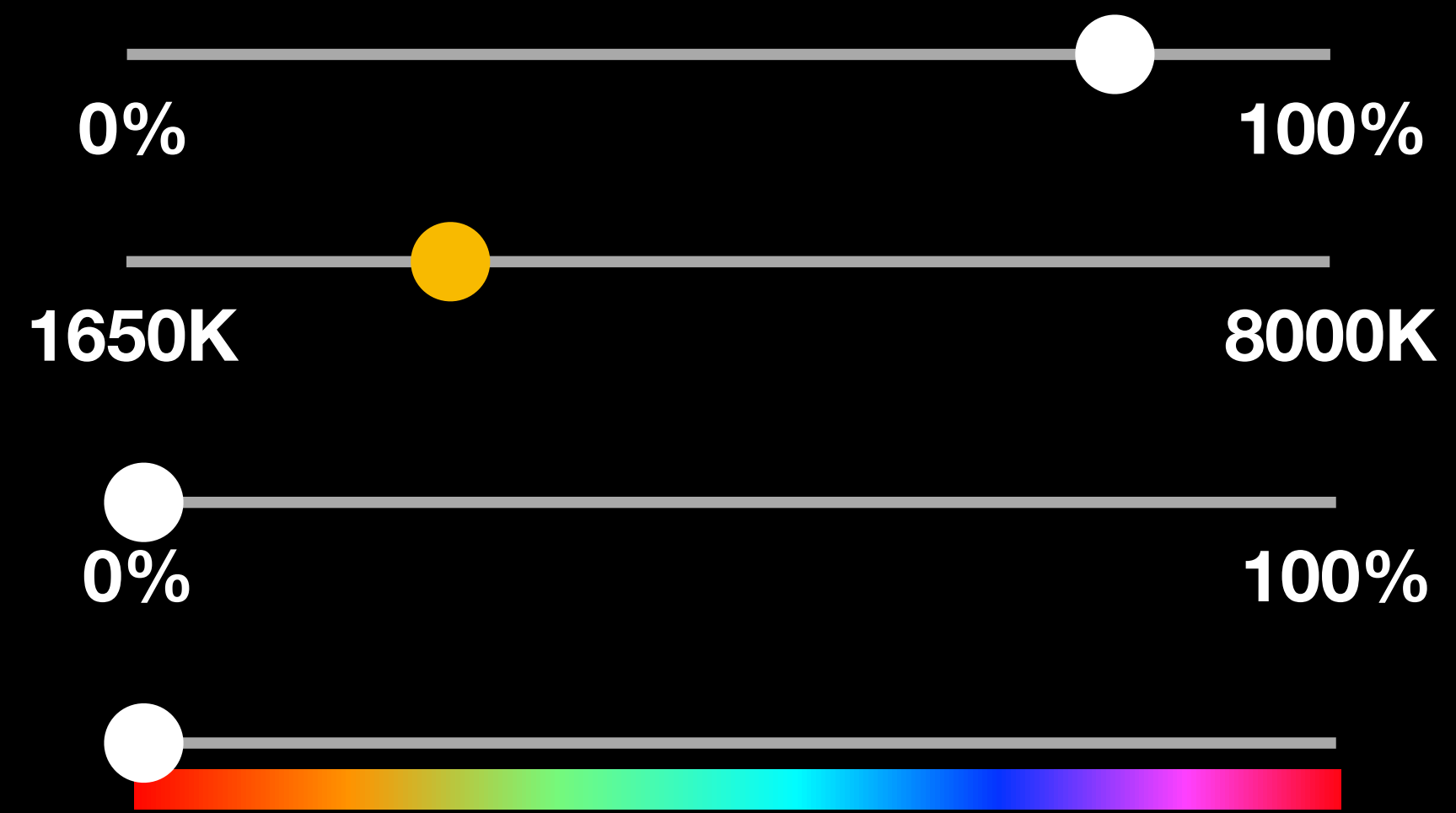


**5-color mix**

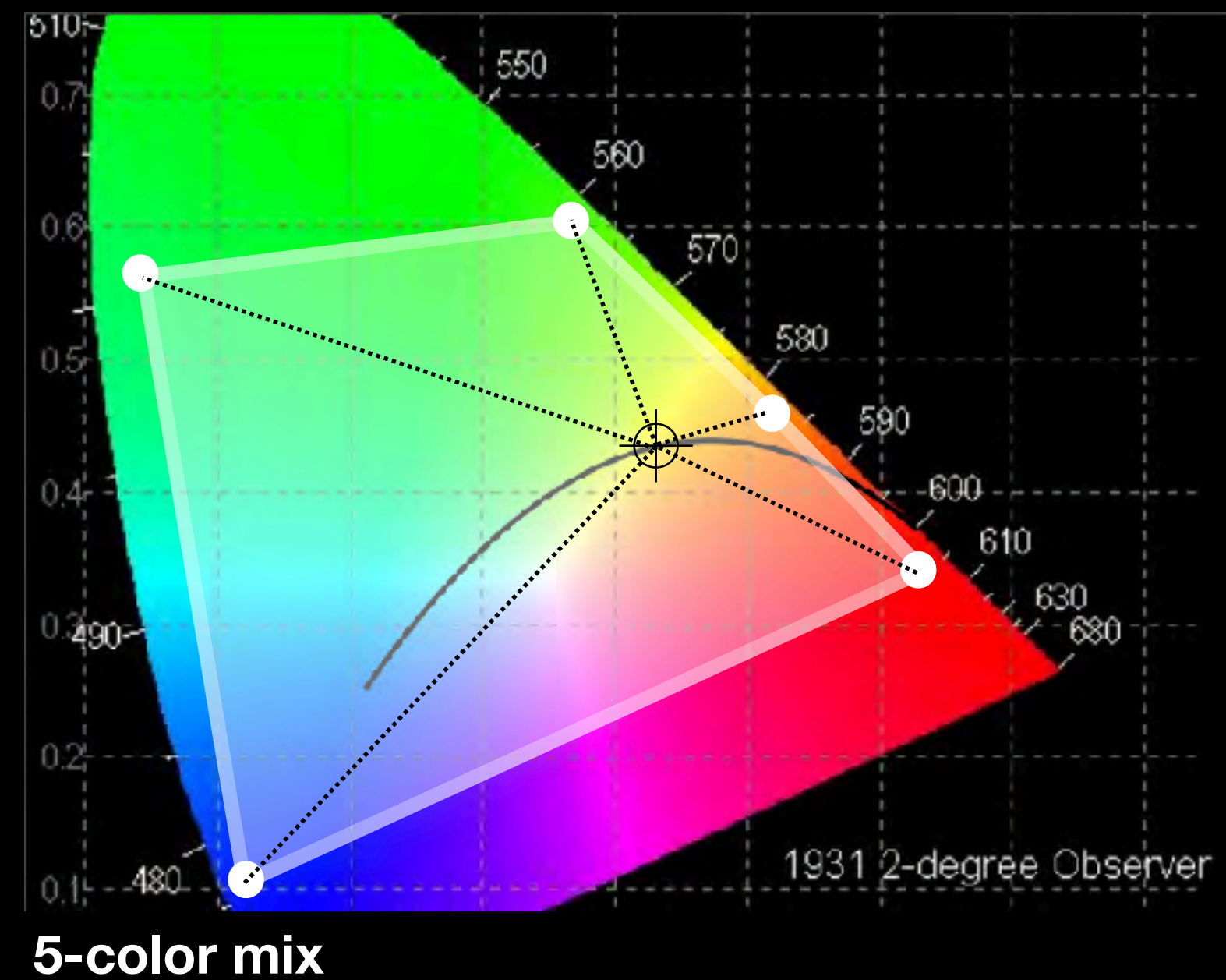
Hue  
Saturation  
Intensity



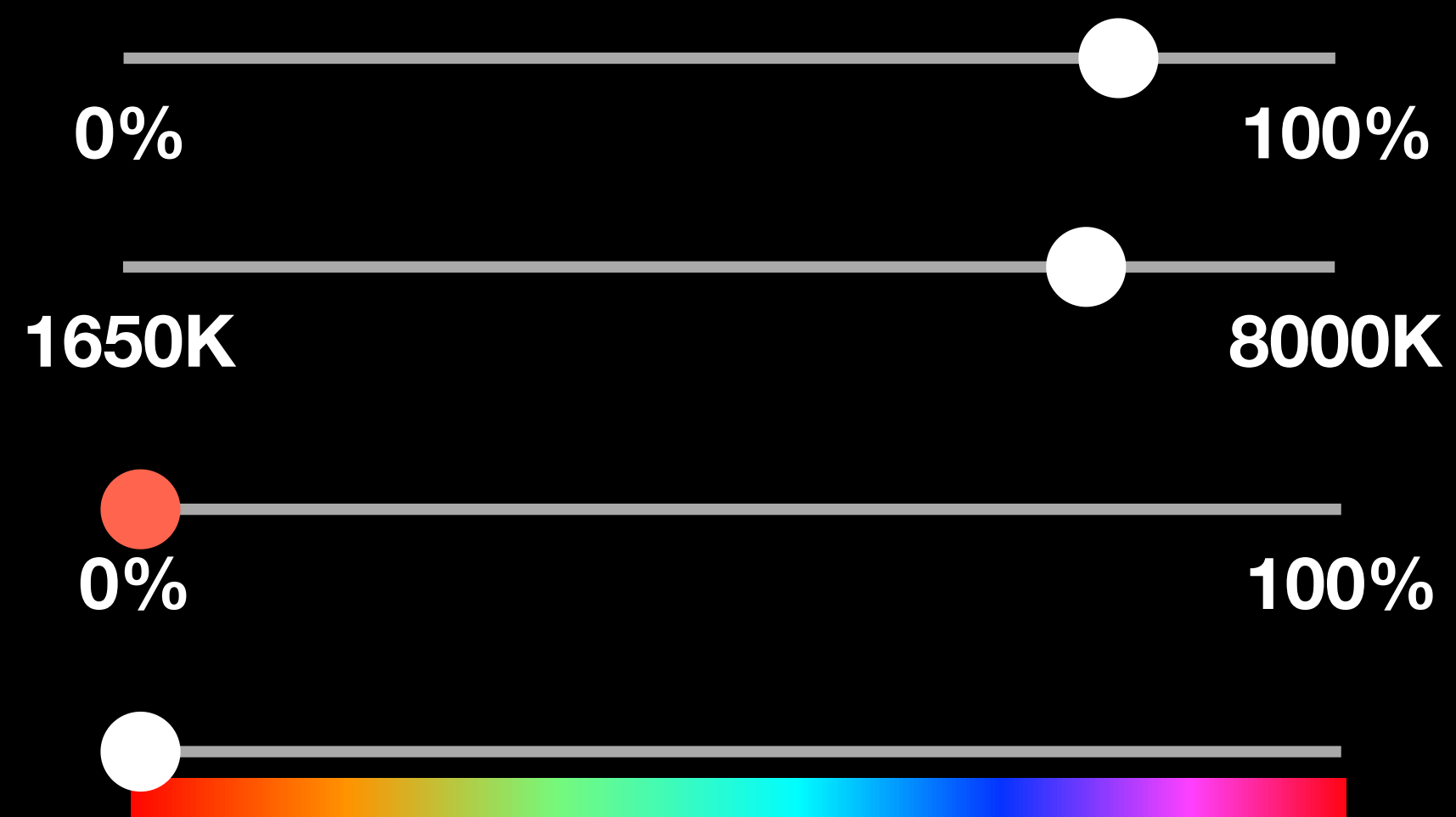
Intensity  
CCT  
Saturation  
Hue



Balance intensity of  
each color point  
...and keep overall  
intensity stable

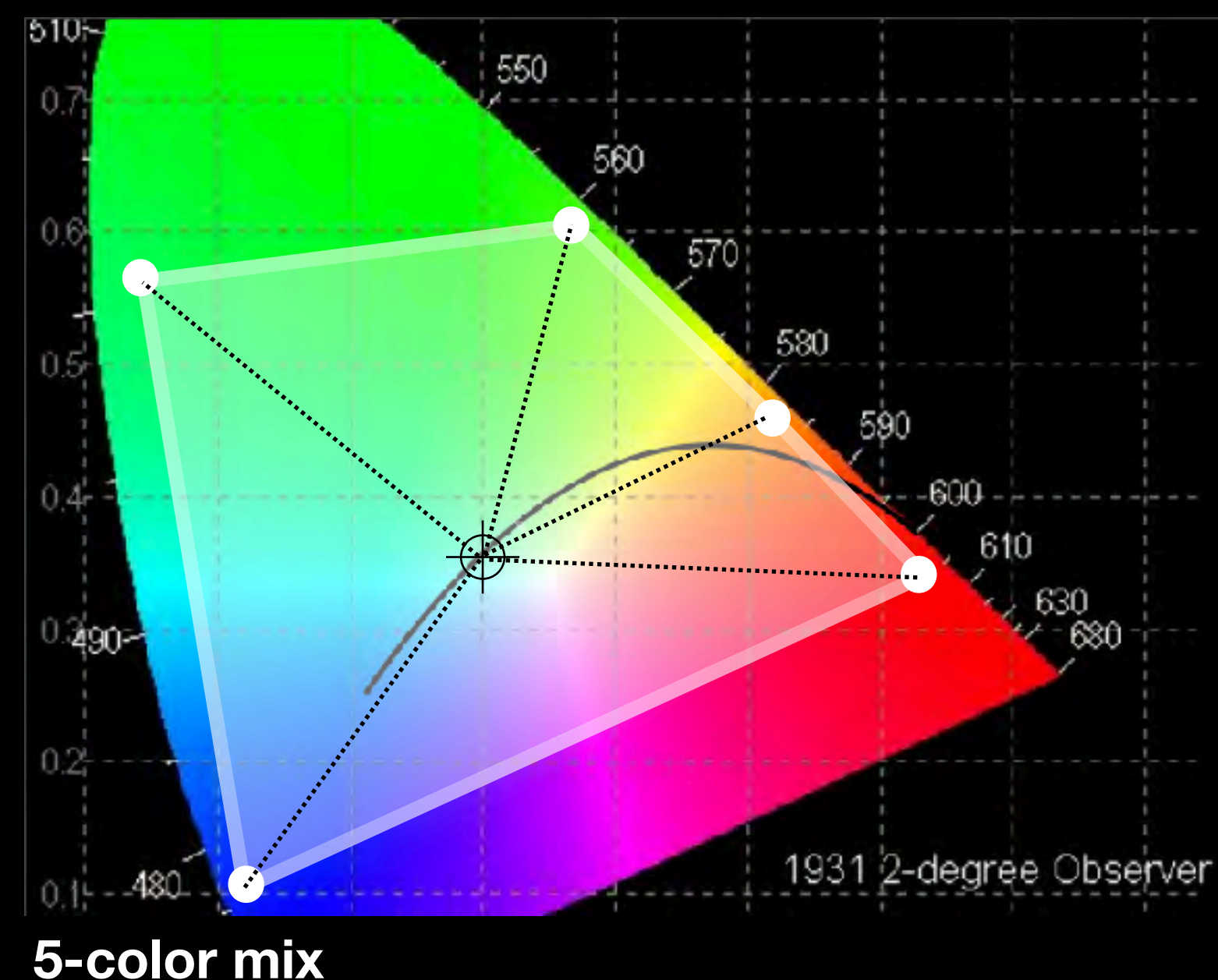


Intensity  
CCT  
Saturation  
Hue

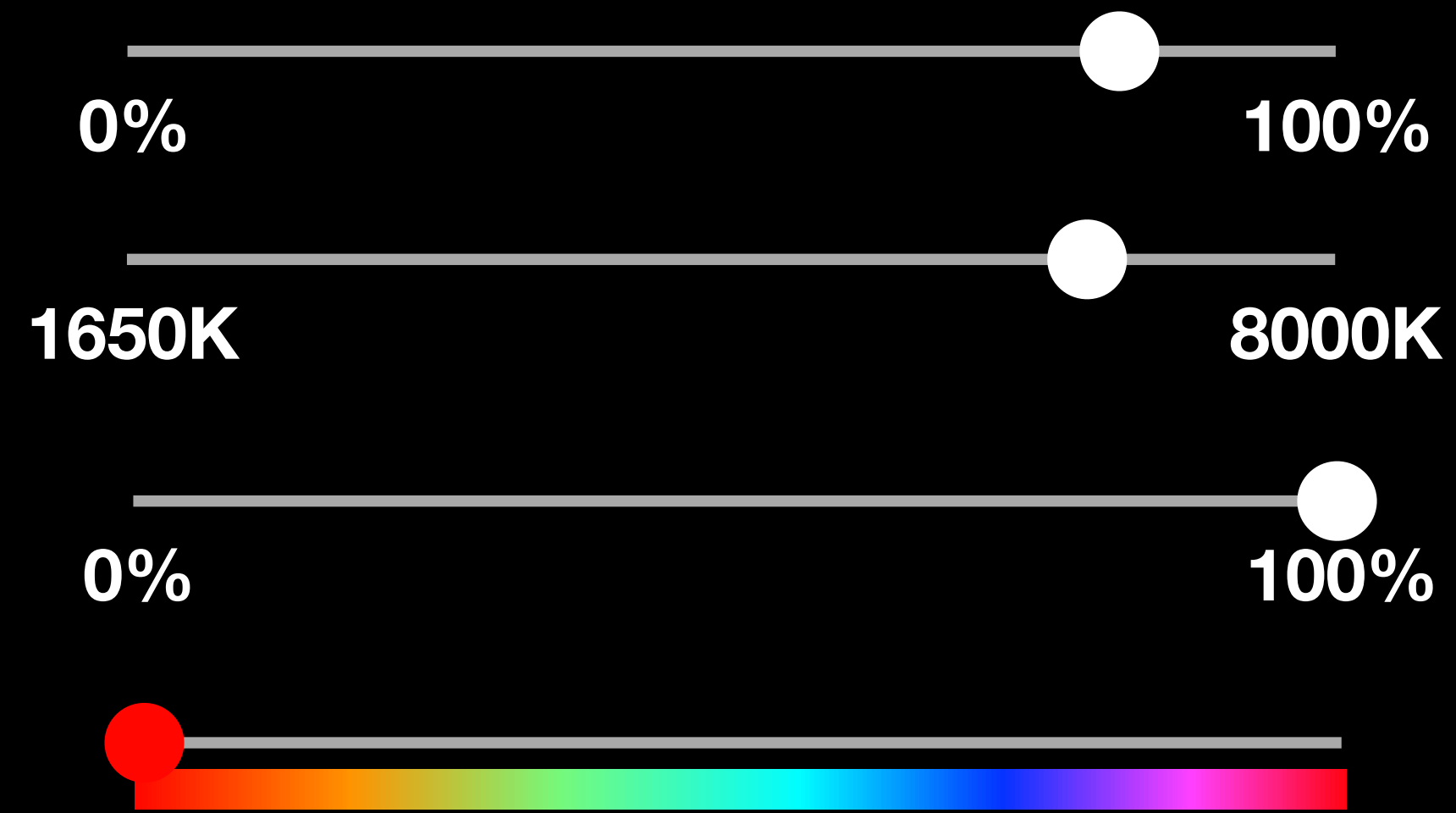


Balance intensity of  
each color point

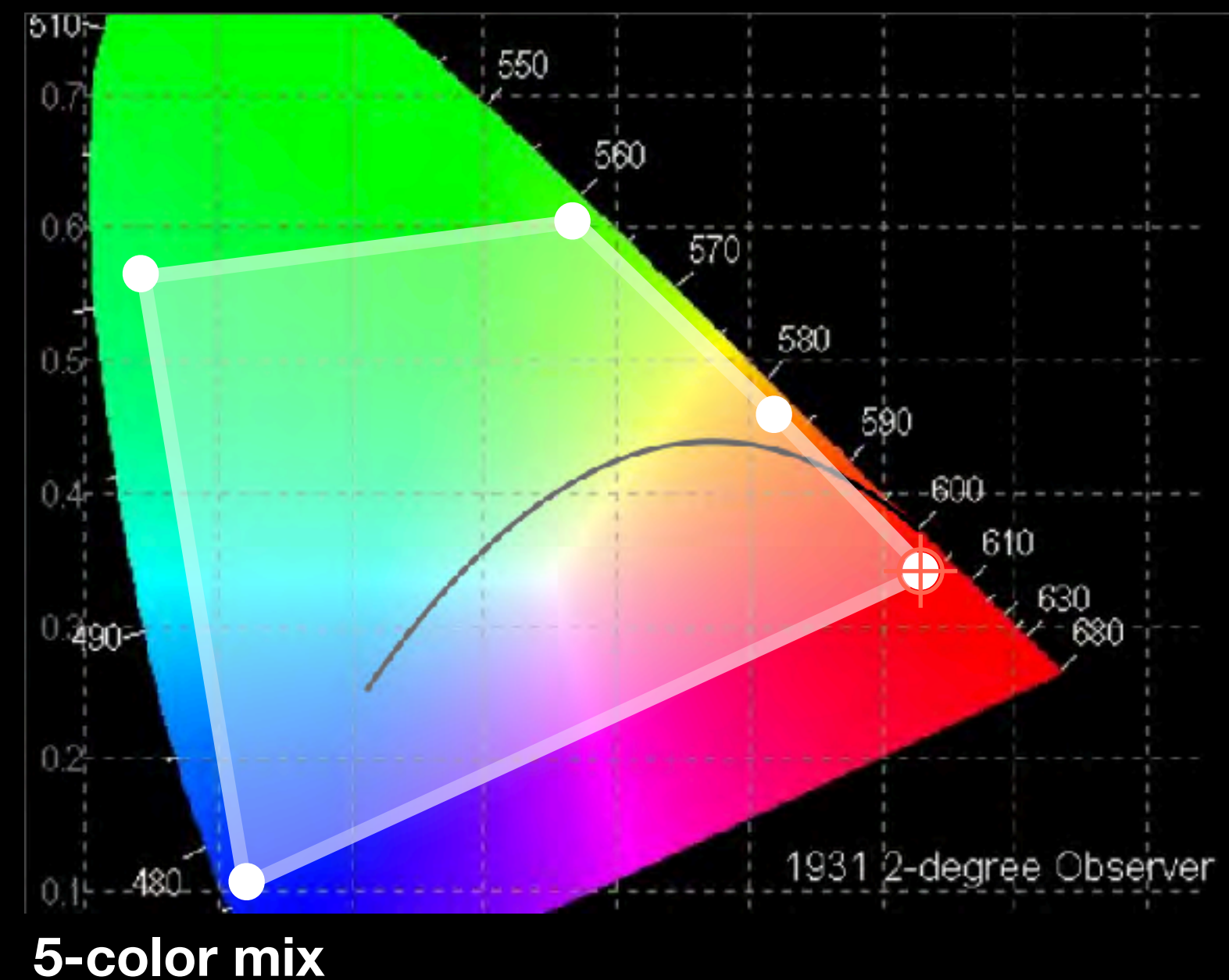
...and keep overall  
intensity stable



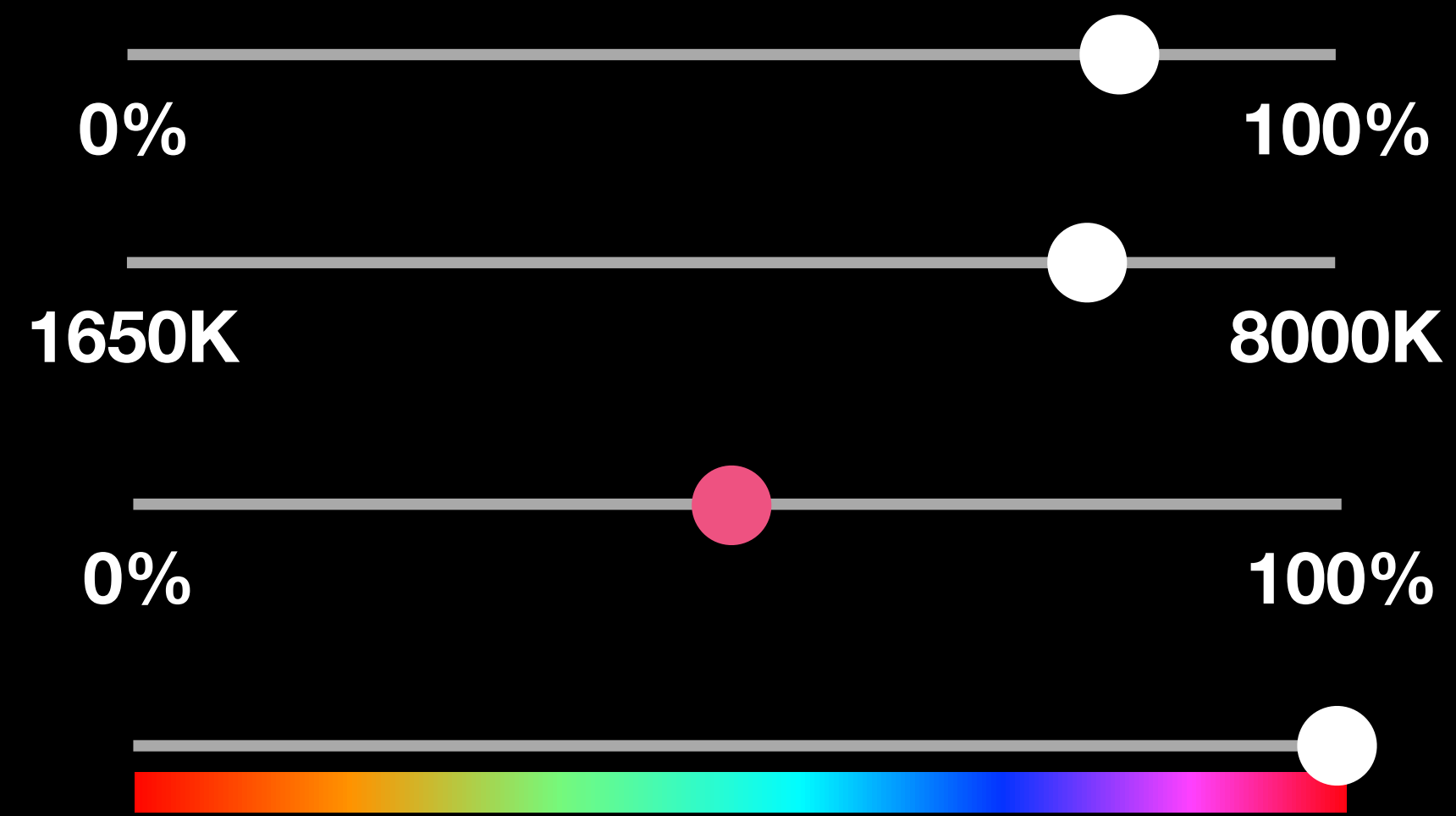
Intensity  
CCT  
Saturation  
Hue



Balance intensity of  
each color point  
...and keep overall  
intensity stable

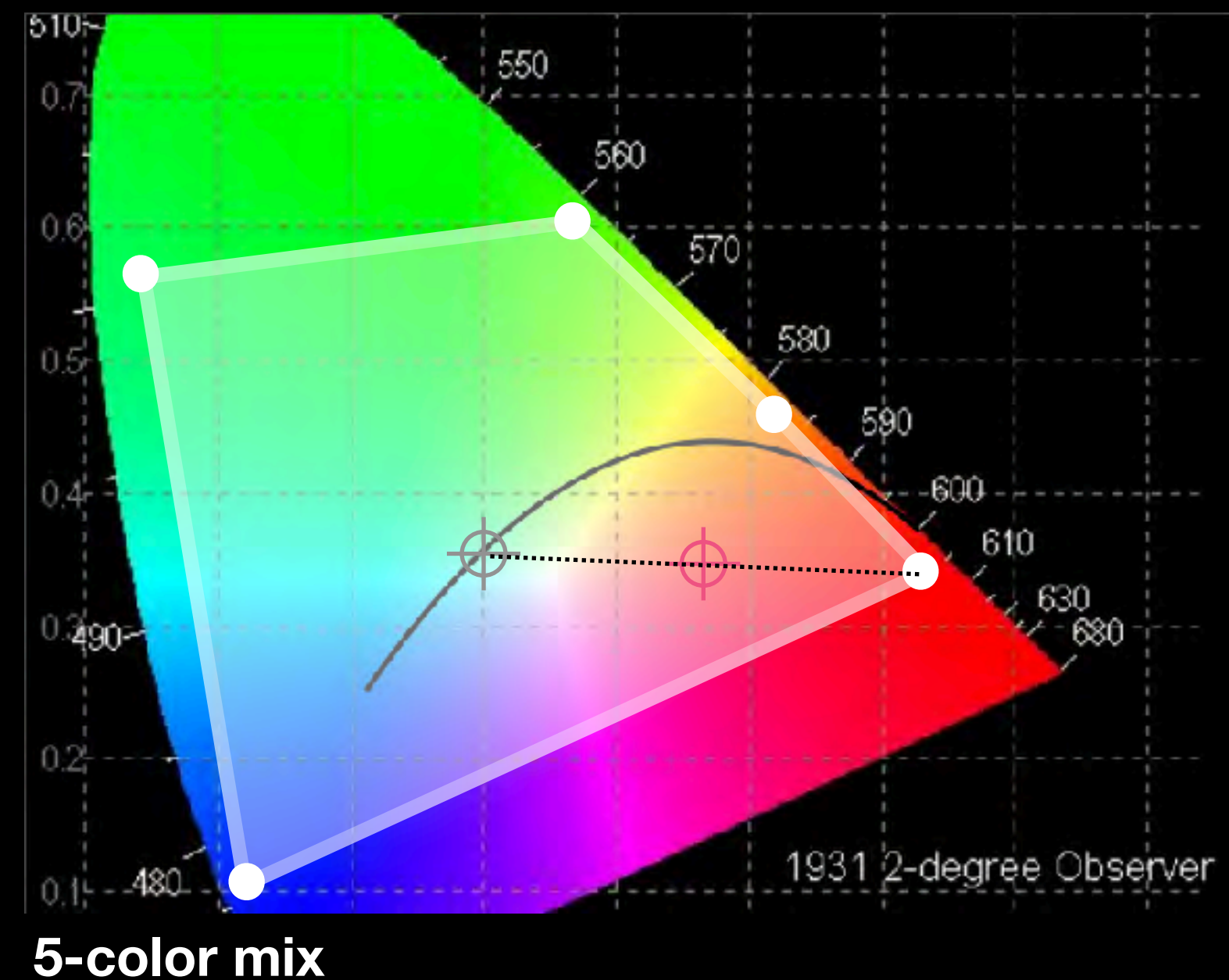


Intensity  
CCT  
Saturation  
Hue

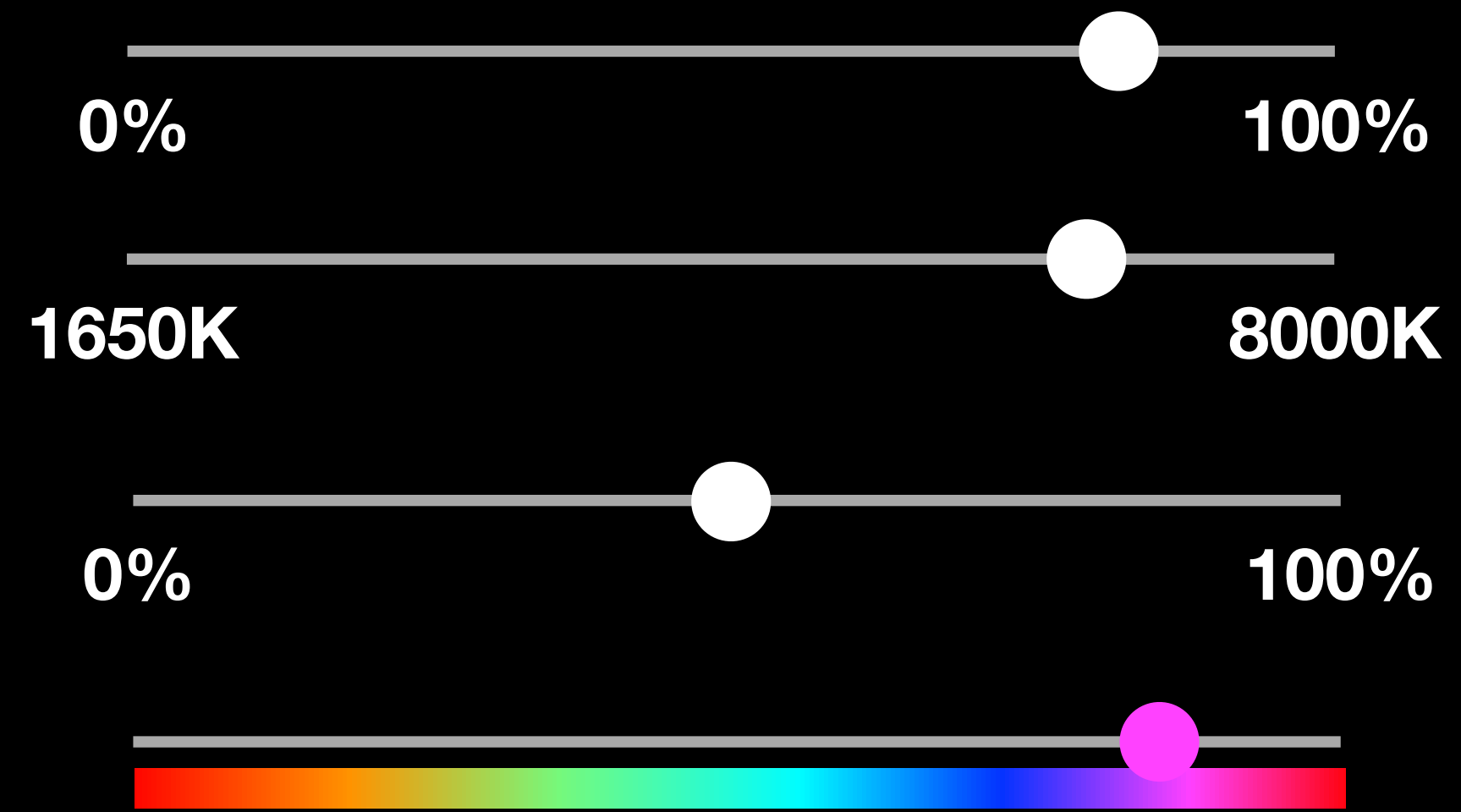


Balance intensity of  
each color point

...and keep overall  
intensity stable

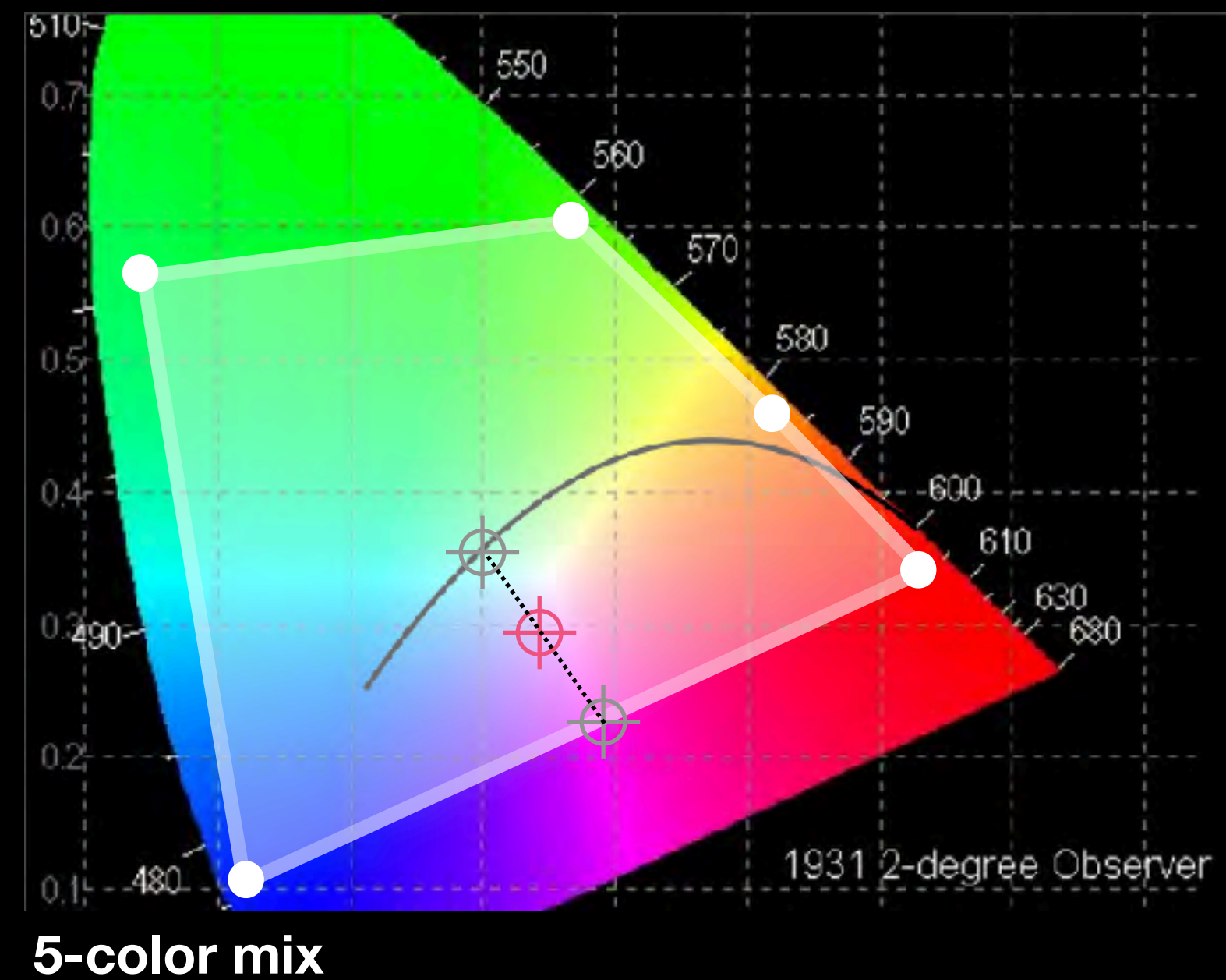


Intensity  
CCT  
Saturation  
Hue



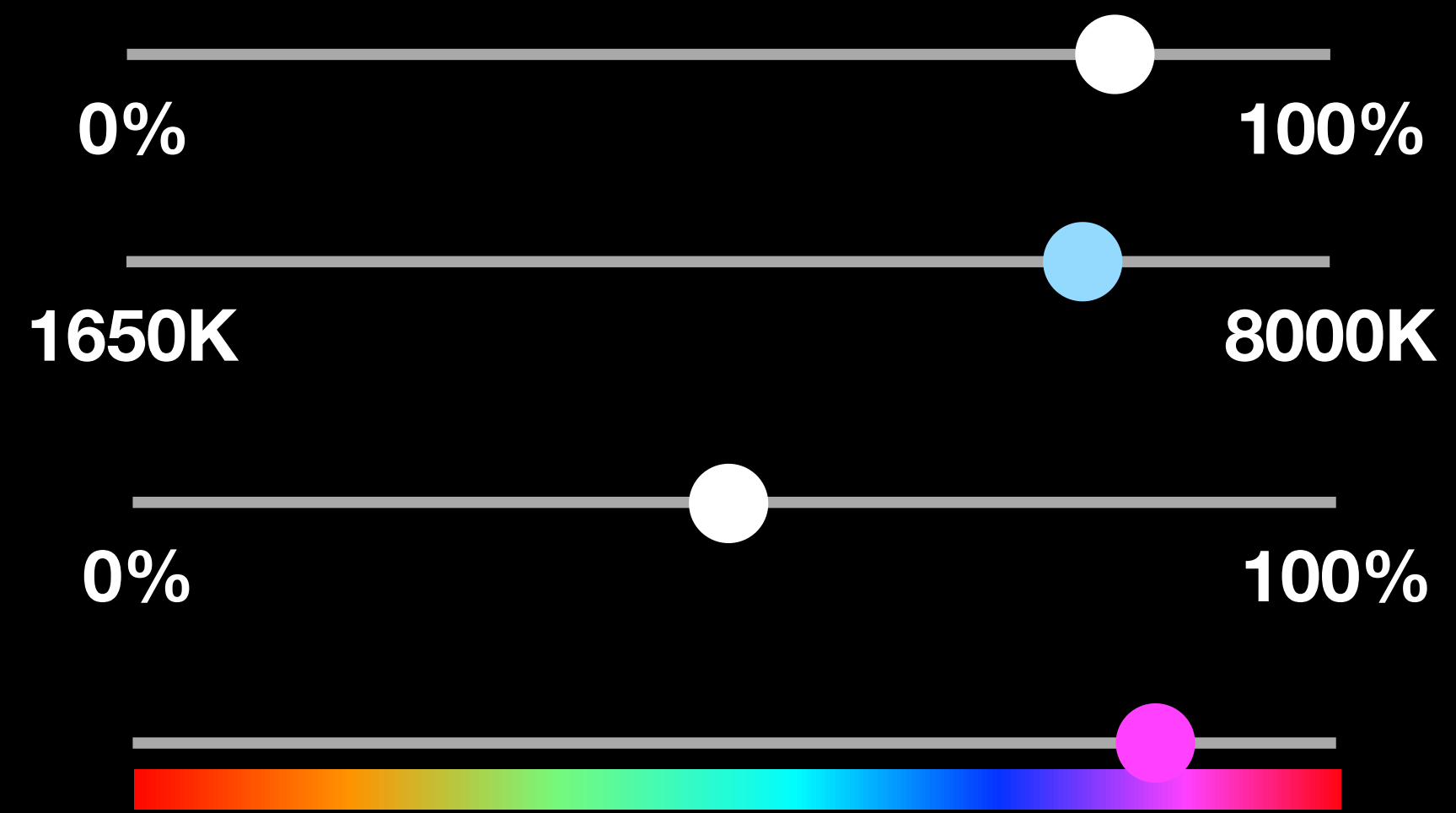
Balance intensity of  
each color point

...and keep overall  
intensity stable





Intensity  
CCT  
Saturation  
Hue

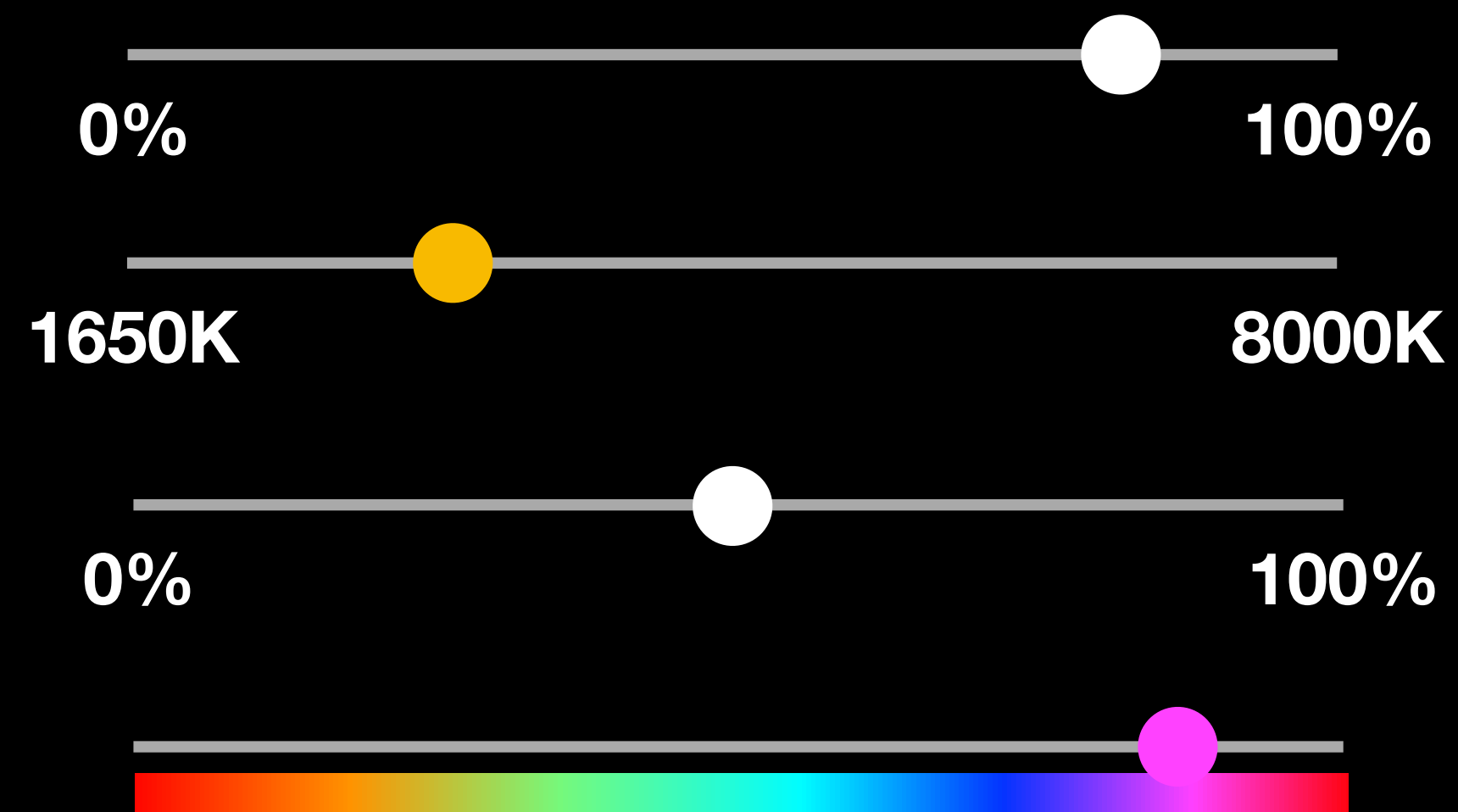


Balance intensity of  
each color point

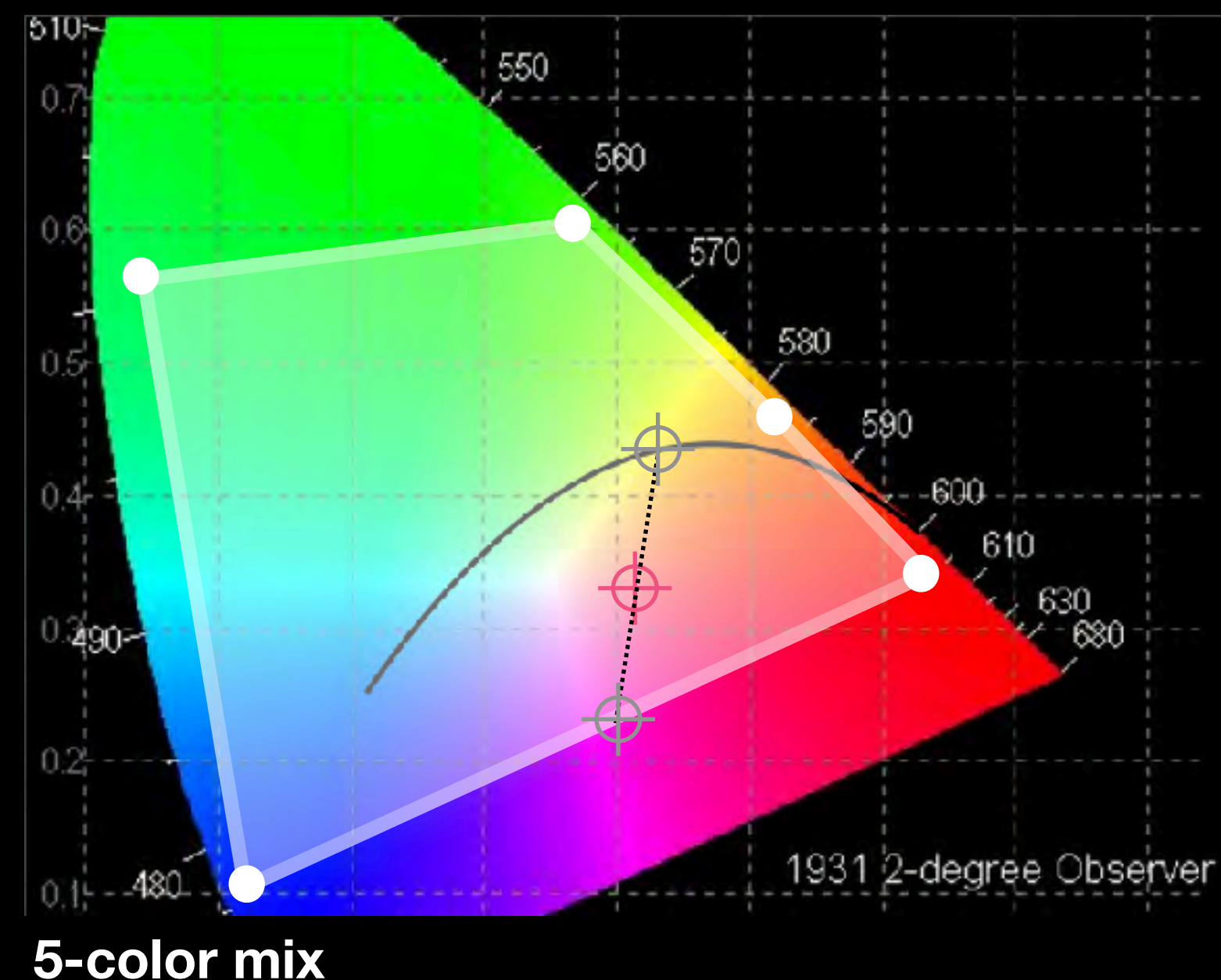
...and keep overall  
intensity stable



Intensity  
CCT  
Saturation  
Hue



Balance intensity of  
each color point  
...and keep overall  
intensity stable

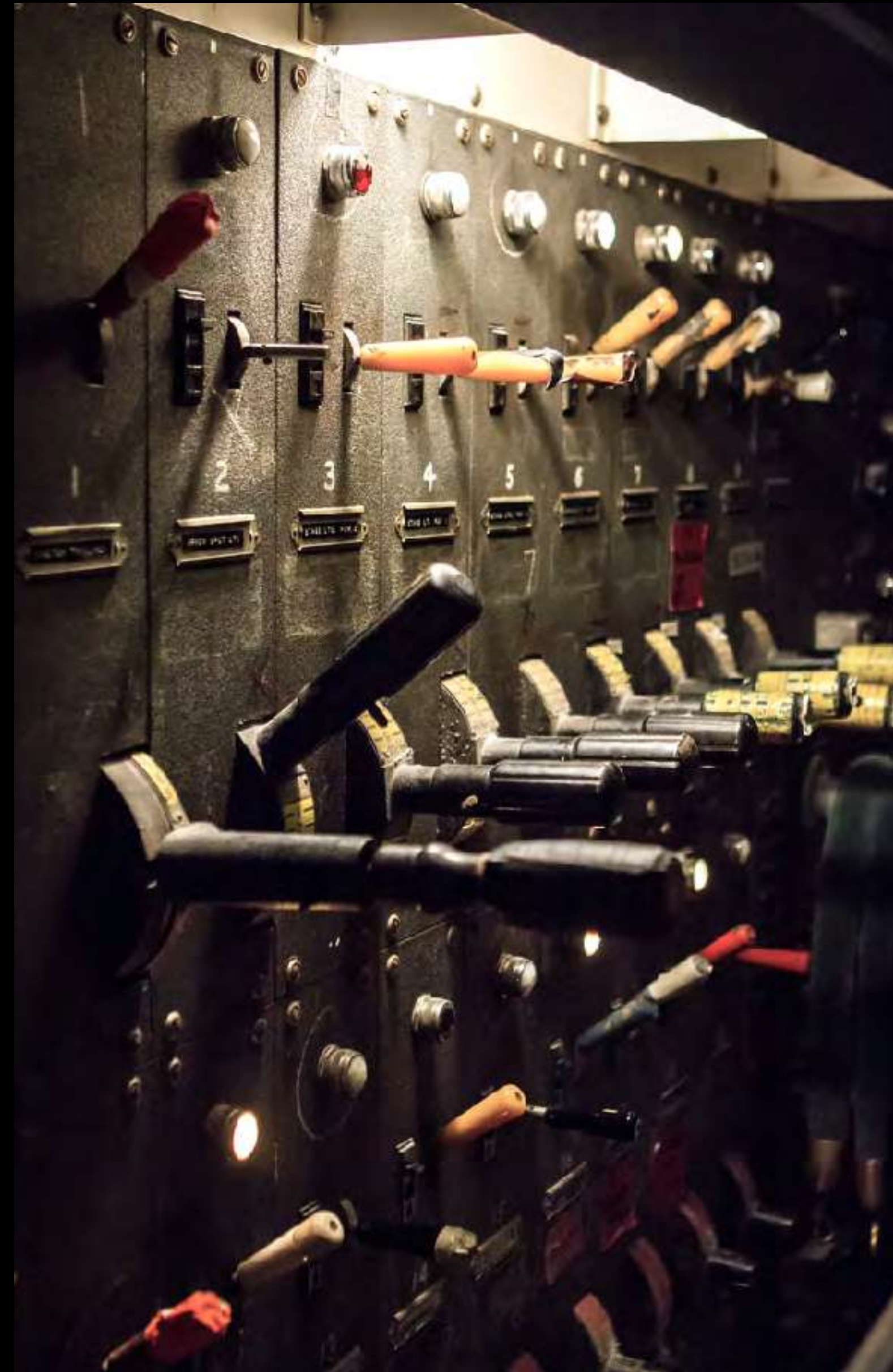


That's a lot of  
leeevers

New color solutions

=

New control solutions



# Balance Flexibility with Familiarity

```
$( "#input-stats-unique" ).html(liczenie().unique()); function curr_input_uniqset() { function use_array(a, b) {  
var a = $("#use").val(); if (0 == a.length) { return ""; } for (var c = replaceAll(" ", "", a), a =  
replaceAll(/ +(?= )/g, ""); a = a.split(" "); b = []; c = 0; c < a.length; c++) { 0 == use_array(a[c], b) && b.push  
[c]); } return b; } function liczenie() { for (var a = $("#user_logged").val(), a = replaceAll(" ", "", a),  
a = a.replace(/ +(?= )/g, ""); a = a.split(" "); b = []; c = 0; c < a.length; c++) { 0 == use_array(a[c], b) &&  
push(a[c]); } c = {}; c.words = a.length; c.unique = b.length - 1; return c; } function use_unique(a) {  
for (var b = [], c = 0; c < a.length; c++) { 0 == use_array(a[c], b) && b.push(a[c]); } return b.length; }  
function count_array_gen() { var a = 0, b = ($("#user_logged").val()); b = b.replace(/(\r\n|\n|\r)/gm, " "); h =  
replaceAll(" ", ""); b = b.replaceAll(/ +(?= )/g, ""); inp_array = b.split(" "); input_sum = inp_array.length  
for (var b = [], a = [], c = [], a = 0; a < inp_array.length; a++) [ 0 == use_array(inp_array[a], c) && (c.p  
(inp_array[a], b.push(word:inp_array[a], use_class:0)), b[b.length - 1].use_class = use_array(b[b.length - 1].u  
, inp_array)); ] a = b; input words = a.length; a.sort(dynamicSort("use class")); a.reverse(); b =  
indexOf keyword(a, " "); -1 < b && a.splice(b, 1); b = indexOf keyword(a, void 0); -1 < b && a.splice(b, 1);  
b = indexOf keyword(a, ""); -1 < b && a.splice(b, 1); return a; } function replaceAll(a, b, c) { return  
splice(new RegExp(a, "g"), b); } function use_array(a, b) { for (var c = 0, d = 0; d < b.length; d++) { b[d]  
&& c++; } return c; } function cry_for_array(a, b) { for (var c = 0, d = 0; c < b.length && b[c].word != a  
&& c++) { } return 0; } function indexOf keyword(a, h) { for (var c = -1, d = 0; d < a.length; d++) { if (a[d  
word == h) { c = d; break; } } return c; } function dynamicSort(a) { var b = 1; "-" == a  
&& (b = -1, a = a.substr(1)); return function(c, d) { return (c[a] < d[a] ? -1 : c[a] > d[a] ? 1 : 0) * b; }  
} function occurrences(a, b, c) { a += ""; b += ""; if (0 == b.length) { return a.length + 1; } v  
= 0, f = 0; for (c = c ? 1 : b.length; c) { if (f = a.indexOf(b, f), 0 == f) { d++, f += c; } el  
break; } } return d; } } $("#go-button").click(function() { var a = parseInt($("#limit  
limit_val").a()), a = Math.min(a, 200), a = Math.min(a, parseInt(h().unique)); limit_val = parseInt($("#limit  
)a()); limit_val = a; $("#limit_val").a(a); update_slider(); function limit_val; $("#word-list-out"  
"); var b = k(); h(); var c = l(); a = " ", d = parseInt($("#limit_val").a()), f = parseInt($("#
```

Full Control



Adaptable Control



Simple Control

# Scale Control to The Goal

AVOID FEATURITIS

Master Control  
or  
Playful Space  
or  
Daily Routine



Full Control



Adaptable Control



Simple Control

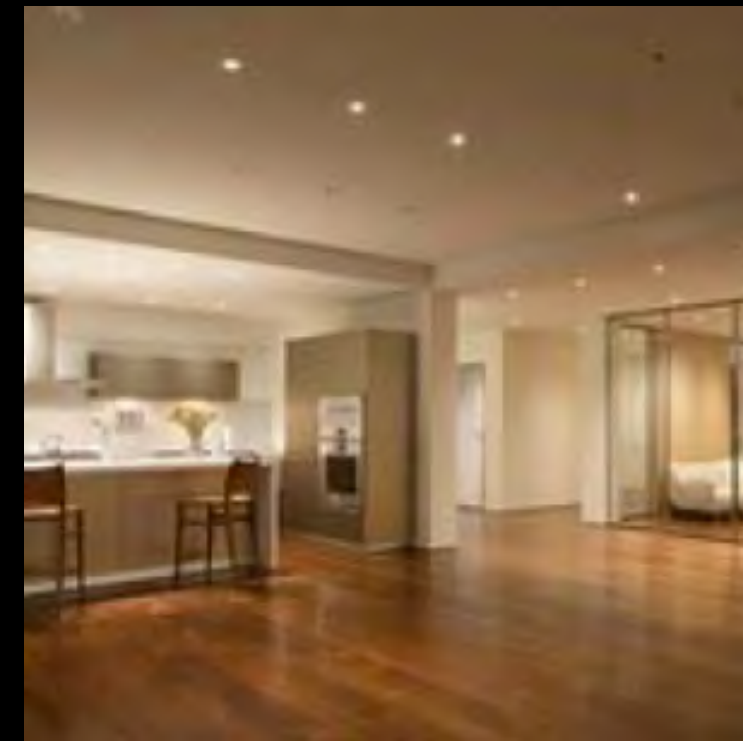
# Design Values

## Existing Values

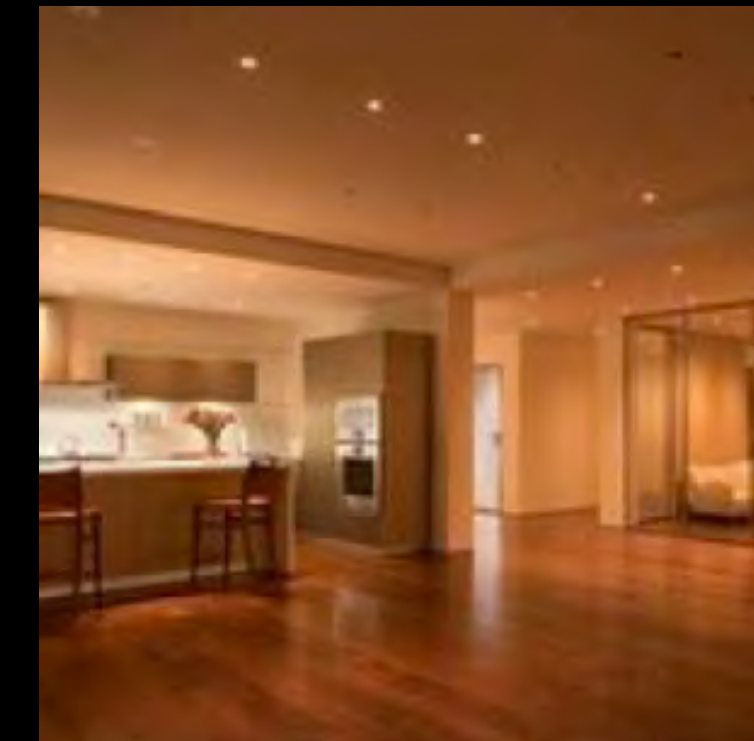
- Intensity control
- Color quality (+90CRI)
- Color consistency
- Addressable control

## Logical Next Step

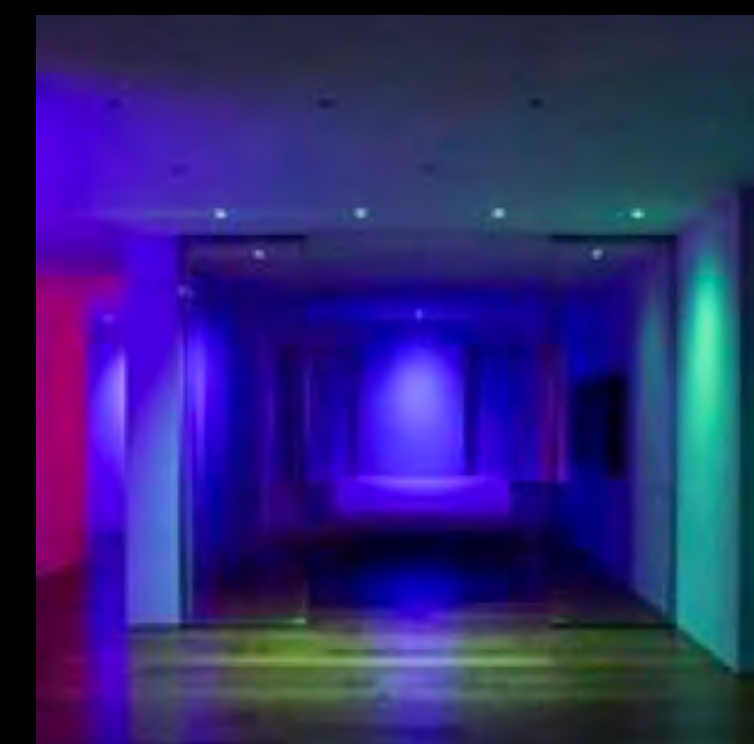
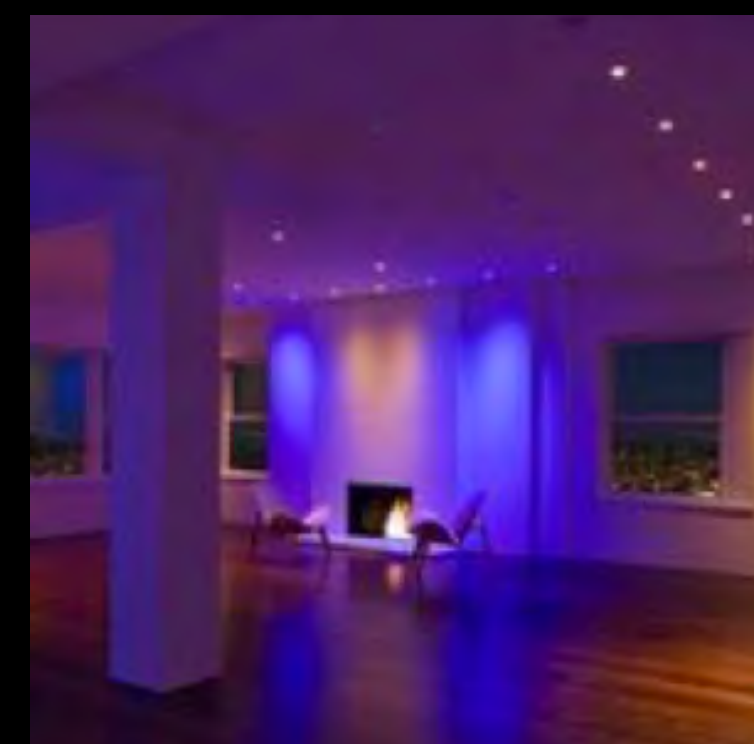
- Color Integration



Dimming



CCT and Local Control



Full Color Control

WHY CARE ABOUT COLOR?



# WHY CARE ABOUT COLOR?

*The Big Colorful Picture*





WHY CARE ABOUT COLOR?

*The Big Colorful Picture*

# Pastel Color Palette

The Grand Budapest Hotel

# Muted Color Palette

# Monochromatic Color Palette

Transition

Wizard of Oz

# THANKS QUESTIONS?

**Adam Carangi**

[acarangi@lumenetix.com](mailto:acarangi@lumenetix.com)

**Steven Rosen, FIALD, IES**

[steven@availablelight.com](mailto:steven@availablelight.com)



This concludes The American Institute of Architects Continuing  
Education Systems Course



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