

/\* ACADEMY  
SOFTWARE  
FOUNDATION

# Overview

March 2024

# Antitrust Policy Notice

Linux Foundation meetings involve participation by industry competitors, and it is the intention of the Linux Foundation to conduct all of its activities in accordance with applicable antitrust and competition laws. It is therefore extremely important that attendees adhere to meeting agendas, and be aware of, and not participate in, any activities that are prohibited under applicable US state, federal or foreign antitrust and competition laws.

Examples of types of actions that are prohibited at Linux Foundation meetings and in connection with Linux Foundation activities are described in the Linux Foundation Antitrust Policy available at [linuxfoundation.org/antitrust-policy](https://linuxfoundation.org/antitrust-policy). If you have questions about these matters, please contact your company counsel, or if you are a member of the Linux Foundation, feel free to contact Andrew Updegrove of the firm of Gesmer Updegrove LLP, which provides legal counsel to the Linux Foundation.

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#ASWF

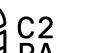
/\* ACADEMY SOFTWARE FOUNDATION

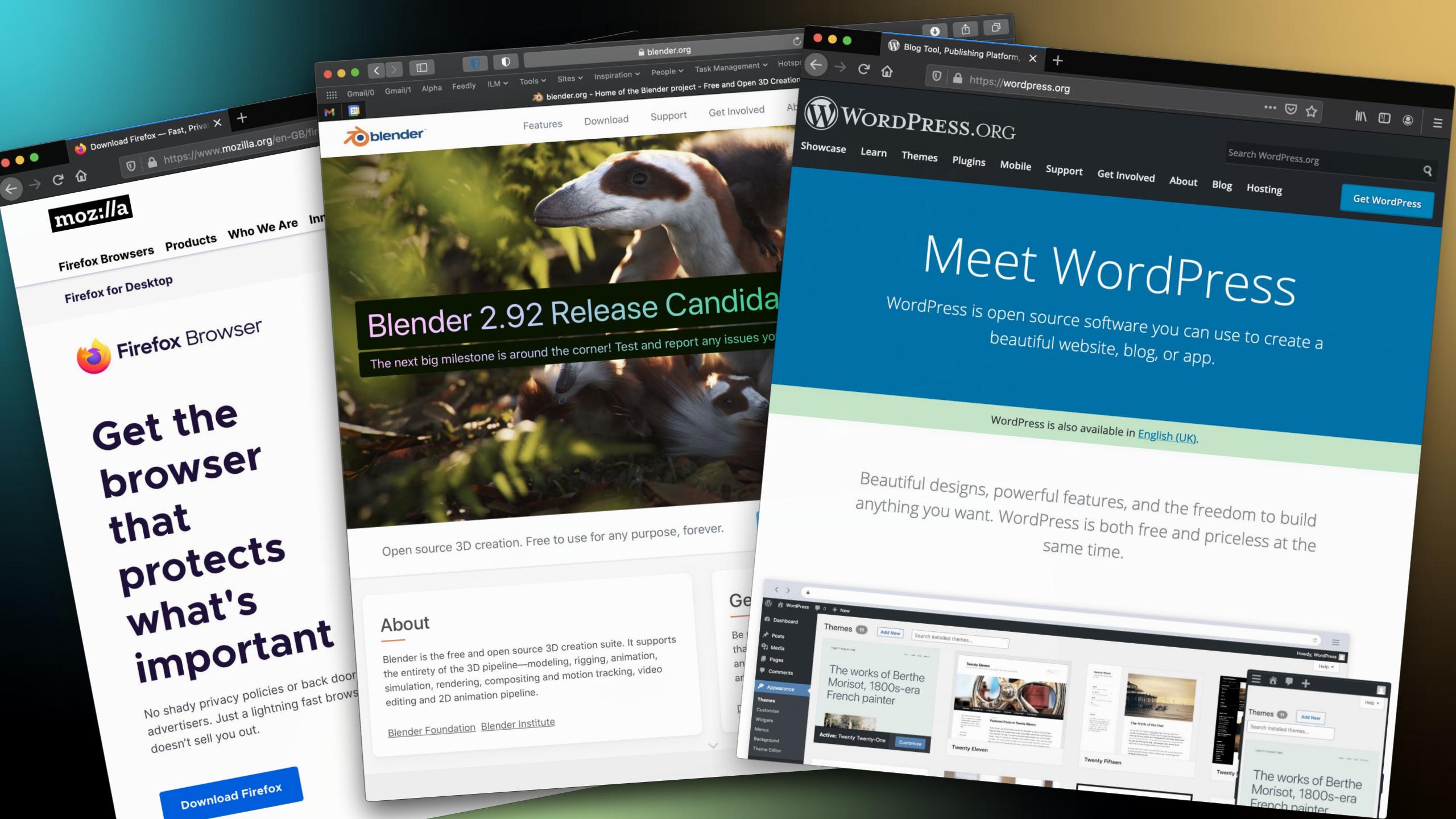
# Why Open Source?

# Why Open Source?

- Software development has a **cost**
  - Development
  - Maintenance
  - Documentation
  - Training
- Open Source ecosystems **share** those costs
- Empower developers to lead development

# Open Source Projects

Vertical Industry	     
Security	      
AI & Data	       
Cloud	       
Networking	       
Edge & IoT	       
Web	       
Visual Effects	      
Sustainability	      
Digital Trust	     
Hardware	     
Standards	      



# Get the browser that protects what's important

No shady privacy policies or back door advertisers. Just a lightning fast browser that doesn't sell you out.

Download Firefox



moz://a

Firefox Browsers Products Who We Are Inspiration  
Firefox for Desktop

The next big milestone is around the corner! Test and report any issues you find.

Open source 3D creation. Free to use for any purpose, forever.

## About

Blender is the free and open source 3D creation suite. It supports the entirety of the 3D pipeline—modeling, rigging, animation, simulation, rendering, compositing and motion tracking, video editing and 2D animation pipeline.

[Blender Foundation](#) [Blender Institute](#)

blender.org

Features Download Support Get Involved About

# Blender 2.92 Release Candidate

WORDPRESS.ORG

Showcase Learn Themes Plugins Mobile Support Get Involved About Blog Hosting

# Meet WordPress

WordPress is open source software you can use to create a beautiful website, blog, or app.

WordPress is also available in [English \(UK\)](#).

Beautiful designs, powerful features, and the freedom to build anything you want. WordPress is both free and priceless at the same time.

Twenty Twenty-One

The works of Berthe Morisot, 1800s-era French painter

Twenty Eleven

Twenty Fifteen

Twenty

The works of Berthe Morisot, 1800s-era French painter

# Open Source: Innovation Accelerator

Standardization on open technologies

Neutral environment for collaboration & cross-pollination

Innovation multiplier

Enables better interoperability

Minimizes fragmentation

Qualifies reference architectures

Lowers barriers to enter a new domain

Enables new business opportunities

Leads to better products

Allows shared cost of development

# About the Academy Software Foundation

#ASWF

/\* ACADEMY SOFTWARE FOUNDATION

# Open Source in Entertainment

*How the Academy Software Foundation  
Creates Shared Value*

A report from  
 | Research

Written by  
Barbara Robertson  
[report.aswf.io](http://report.aswf.io)

DUNE Image Courtesy of DNEG © Legendary  
Warner Bros. Entertainment Inc. All Rights Reserved.



# An Open Source Foundation Developed in Partnership



The Academy Software Foundation provides a neutral forum for open source software developers in the motion picture and broader media industries to share resources and collaborate on technologies for image creation, visual effects, animation and sound.



# Why the Academy Software Foundation?

- Legal Framework
- Continuous Integration and Build Infrastructure
- Clear path to accepting contributions (neutral forum)
- Versionitis

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SOFTWARE  
FOUNDATION

# ASWF created

August 10, 2018

*Founding members:*

Animal Logic

Autodesk

Blue Sky Studios

Cisco

DNEG

DreamWorks

Animation

Epic Games

Foundry

Google Cloud

Intel

SideFX

The Walt Disney

Studios

Weta Digital



Scitech  
Council

Open source  
Investigation  
concludes

01

First project

October 23, 2018

[OpenVDB](#)

*New members:*

Sony Pictures

Entertainment

Warner Bros.

Blender Foundation

Visual Effects Society

February 8, 2019

[OpenColorIO](#)

02

Open Source Day 2019

July 29, 2019

[OpenTimelineIO](#)

Netflix

Amazon Web Services

Rodeo FX

MovieLabs

Sept. 13, 2019

Apple

Microsoft

05

May 1 2019

[OpenEXR](#)

[OpenCue](#)

NVIDIA

ftrack

Red Hat

04

April 16  
2020

[Open Shading  
Language](#)

AMD  
DockYard

07

Open Source Days 2020

August 19-20 2020

Unity Technologies

Conductor

Technologies

SMPTE

Dec. 15,  
2020

Adobe

ETC

08

10

Wevr

Jan. 28  
2022

11

Open Source Days 2021

August 4-5 2021

[MaterialX](#)

Maxon

Open Source Forum 2022

March 10, 2022

[Rez](#)

[DPEL](#)

[Raw2ACES](#)

12

Open Source Days 2022

August 8-9, 2022

[OpenFX](#)

[OpenAssetIO](#)

[Open Review](#)

[Initiative](#)

Canonical

Khronos Group

13

Open Source Forum 2023

Feb. 16, 2023

HP

Framestore

14

Open Source Forum 2024

Feb. 22, 2024

Mod Tech Labs

15

Open Source Days 2023

July 25 -  
August 7, 2023

[OpenImageIO](#)

Otoy

Bolt Graphics

Coreweave

16

May

August

Oct

Feb

May

August

Nov

Jan

May

August

Jan

August

Feb

August

April

August

Feb

2018

2019

2020

2021

2022

2023

2024



# Membership

## Premier



ACADEMY  
OF MOTION PICTURE  
ARTS AND SCIENCES



## General



Wevr

## Associate



ENTERTAINMENT  
TECHNOLOGY  
CENTER



Visual Effects Society

# Governing Board Representatives



**Rob Bredow**  
**Chair**  
SVP, Chief Creative Officer  
Industrial Light & Magic



**Alexander Forsythe**  
Director, Imaging Technology  
Academy of Motion Picture Arts and Sciences



**Buzz Hays**  
Global Lead Entertainment Industry Solutions  
GCP Google LLC



**Daniel Heckenberg**  
Senior Software Engineer  
Netflix, Inc.



**Darin Grant**  
**Treasurer**  
CTO  
Animal Logic Pty Ltd



**Eric Bourque**  
VP Content Creation  
Autodesk



**Gregory Ducatel**  
Executive Director, Software Development  
Sony Pictures Entertainment



**Guido Quaroni**  
Senior Director of Engineering, 3D & Immersive  
Adobe Inc.



**Guy Martin**  
Director, Open Source & Standards  
NVIDIA Corporation



**James Knight**  
Virtual Production Director  
Advanced Micro Devices (AMD)



**Jeremy Smith**  
Hewlett Packard Enterprise Company



**Kimball Thurston**  
Chief Technology Officer  
Weta Digital Limited



**Mark Jackels**  
Director of Research Development  
DreamWorks Animation



**Michael B Johnson**  
Innovation Architect, Pro Workflow  
Apple Inc.



**Paul Salvini**  
Global Chief Technology Officer  
DNEG



**Pauline Koh**  
Senior Product Manager, Technical  
Amazon Web Services, Inc.



**Phil Parsonage**  
Director of Engineering  
The Foundry Visionmongers Limited



**Sean McDuffee**  
Graphics Software Engineer  
Intel Corporation



**Sebastien Miglio**  
VP Product and Engineering Creator Tools  
Epic Games, Inc



**Simon Crownshaw**  
Worldwide Media and Entertainment Strategy Director  
Microsoft Corporation

# Governing Board Alternates



Alexander Wilkie  
Head of R & D  
Animal Logic Pty Ltd  
Colette Mullenhoff  
Member, Science and Technology Council  
Academy of Motion Picture Arts and Sciences  
Erik Niemeyer  
Intel Corporation



Milind Damle  
Advanced Micro Devices (AMD)  
Morgan Prygrocki  
Sr. Strategic Development Manager  
Adobe Inc.



Rachel Rose  
Director, Research & Development  
Industrial Light & Magic

Robert Fanner  
Engineering Manager - Platform  
The Foundry Visionmongers Limited

Sarah Counnas  
DreamWorks Animation

Sean Wallitsch  
Solutions Architect  
Amazon Web Services, Inc.

Sebastian Sylwan  
Director of R&D  
Netflix, Inc.

Tony Micilotta  
Senior Director, Content Creation Engineering  
Autodesk

# Technical Advisory Council (TAC)



Kimball Thurston  
**Chair**  
Chief Technology Officer  
Weta Digital Limited



Bill Roberts  
Sr Director of Strategy  
Adobe Inc.



Brian Cipriano  
Senior Software Engineer / TSC Lead  
Google LLC



Carol Payne  
Imaging Technologist  
Netflix, Inc.



Cary Phillips  
R&D Supervisor  
Industrial Light & Magic



Chris Kulla  
Principal Rendering Engineer  
Epic Games, Inc



Cory Omand  
Director of Engineering,  
Pixar Software R&D  
The Walt Disney Studios



Eric Enderton  
Dir. Film Rendering Tech.  
NVIDIA Corporation



Eric Reinecke  
Sr. Software Engineer, Video Engineering  
Netflix, Inc.



Erik Niemeyer  
Senior Staff Software Enabling and Optimization Engineer  
Intel Corporation



Gordon Bradley  
Senior Software Architect  
Autodesk



Greg Denton  
Senior Program Manager  
Microsoft Corporation



Jean-Francois Panisset  
Consulting Engineer  
Visual Effects Society



Jean-Michel Dignard  
LEAD PROGRAMMER  
Epic Games, Inc



Jonathan Stone  
Lead Rendering Engineer,  
Materials and Shading  
Lucasfilm



Ken Museth  
Senior Director, Simulation Technology  
NVIDIA Corporation



Larry Gritz  
Software Architect  
Sony Pictures Imageworks



Matthew Low  
Principal Engineer  
DreamWorks Animation



Michael B. Johnson  
Innovation Architect, Pro Workflow  
Apple Inc.



Milind Damle  
Sr. Director  
Advanced Micro Devices (AMD)



Ross Dickson  
Amazon Web Services, Inc.



Scott Dyer  
Senior Imaging Engineer  
Academy of Motion Picture Arts and Sciences

# Behind the Screens

[aswf.io/behind-the-screens](http://aswf.io/behind-the-screens)



# Our Mission

Increase the *quality* and *quantity* of open source contributions by establishing a *governance model*, a *legal framework* and a *community infrastructure* that lowers the barrier to entry for developing and using open source software.

# Our Goals

- Provide a neutral forum to coordinate cross-project efforts, establish best practices and share resources.
- Develop an open continuous integration (CI) and build infrastructure to enable reference builds from the community.
- Streamline development for build and runtime environments through the sharing of open source build configurations, scripts and recipes.
- Provide individuals and organizations with a clear path for participation and code contribution.
- Provide better, more consistent licensing through a shared licensing template.
- Create working groups for exploration of new or larger projects.
- Focus on diversity and inclusion and raising the profile of software engineers in our industry.

# Our Projects



**OpenColorIO**

Contributed By

Sony Pictures Imageworks



**OpenCue**

Contributed By

Sony Pictures Imageworks and  
Google Cloud



**OpenEXR**

Contributed By

Lucasfilm



**OpenVDB**

Contributed By

Dreamworks Animation



**DPEL**  
Digital Production Example Library

Contributed By

Academy Software Foundation



**MATERIALX**

Contributed By

Lucasfilm



**open shading language**

Contributed By

Sony Pictures Imageworks



**OpenFX**

Contributed By

Open Effects Association



**OpenImageIO**

Contributed By

Larry Gritz



**OpenTimelineIO**

Contributed By

Pixar Animation Studios



Contributed By

The Academy of Motion Picture Arts  
and Sciences



**rez**

Contributed By

Allan Johns



**OPEN REVIEW  
INITIATIVE**

Contributed By

Academy Software Foundation



Contributed By

Foundry

# Diversity & Inclusion

## Diversity & Inclusion Working Group

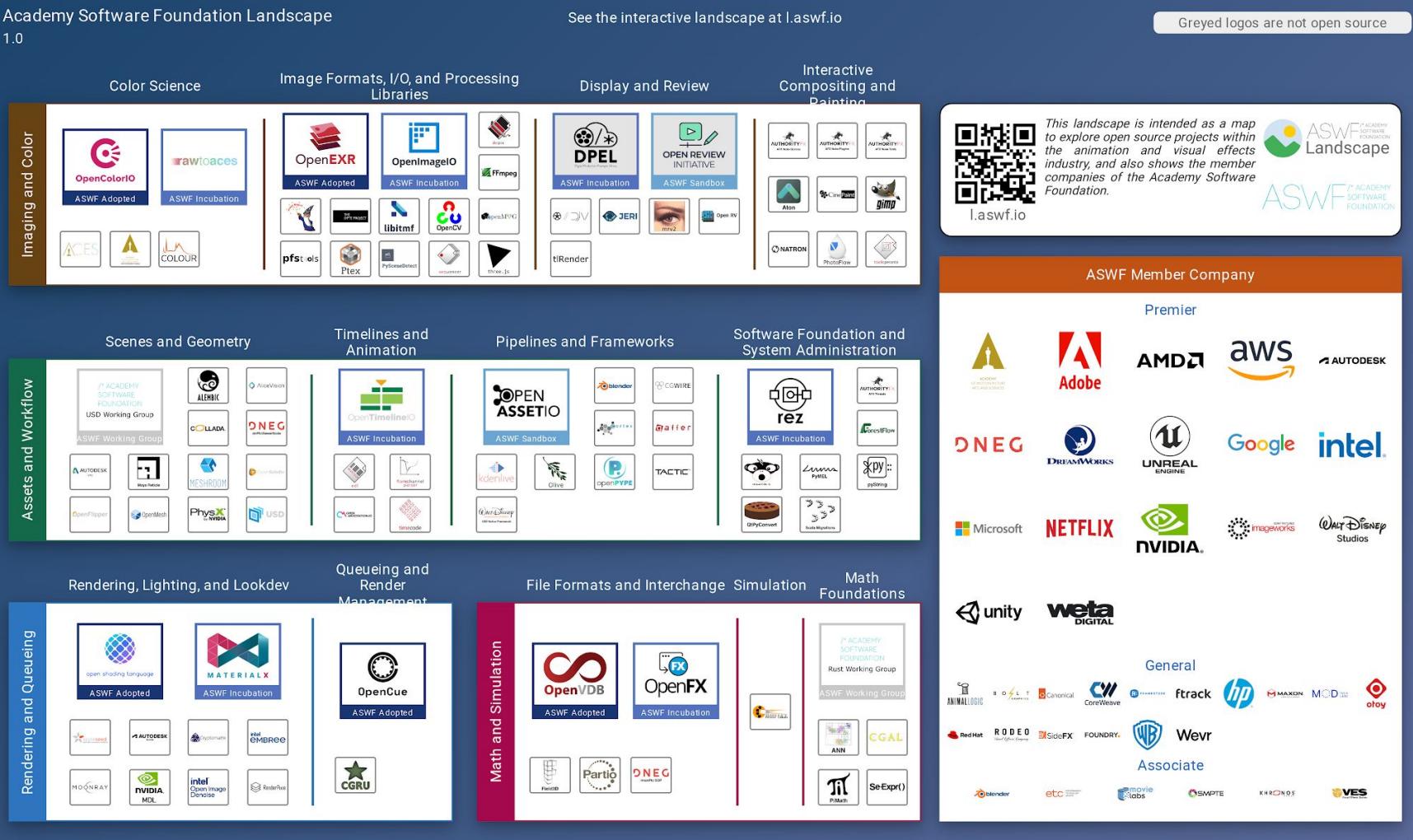
“Open source has the power to break down racial, gender, and corporate barriers to unite people around a shared goal...”

Read more at [aswf.io/diversity\\_inclusion](https://aswf.io/diversity_inclusion)

# ASWF Landscape

## Academy Software Foundation Landscape

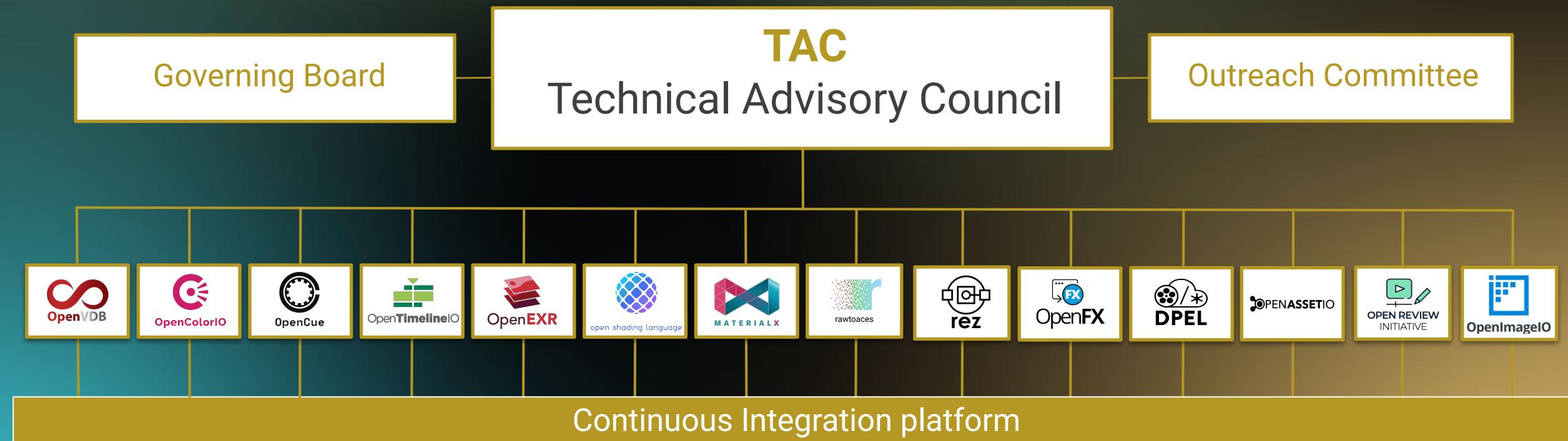
1.0



## [l.aswf.io](https://l.aswf.io)

- Public list of open source projects in the animation and VFX industry
- Updates can be submitted via GitHub
- Goal is to have all active, open source projects in animation and VFX industries represented.

# Academy Software Foundation Structure





*The Croods; courtesy of DreamWorks Animation*



[openvdb.org](http://openvdb.org)



*How to Train Your Dragon: The Hidden World; courtesy of DreamWorks Animation*

- First project adopted by ASWF in Sept. 2018; first project to graduate to adopted status in July 2019.
- Developed by DreamWorks Animation in 2012.
- C++ library for volumetric representations including fluid simulations, animated volumes and environmental effects.
- Academy Technical Achievement Award recipient.
- Key contributors include DreamWorks, Autodesk, DNEG, Industrial Light & Magic, NVIDIA, SideFX, Weta Digital.



# OpenColorIO

[opencolorio.org](http://opencolorio.org)

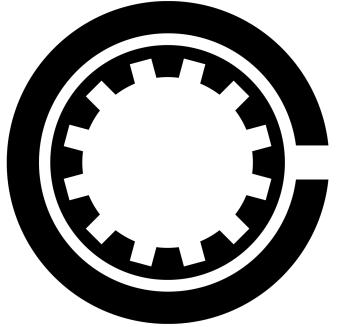


Spider-Man™: Into the Spider-Verse; all images courtesy of Imageworks

- Joined ASWF in Feb. 2019; adopted status in Nov. 2019.
- Developed by Sony Pictures Imageworks in 2003.
- Provides a consistent user experience across digital content creation applications; widely adopted in VFX and computer animation studios and software.
- Academy Technical Achievement Award recipient.
- Key contributors include Imageworks, Autodesk, DNEG, ILM, Foundry, Framestore.
- OCIO v2 released fall 2020, led by Autodesk.

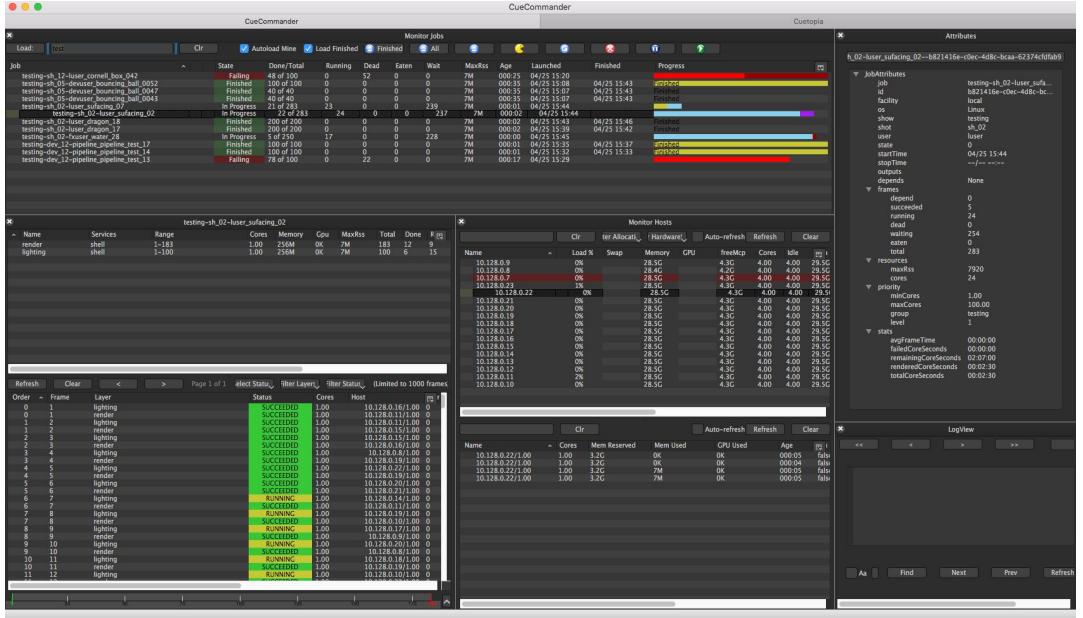


Smurfs: The Lost Village; courtesy of Sony Pictures Imageworks



# OpenCue

[opencue.io](http://opencue.io)



OpenCue screenshot

- Joined ASWF in April 2019.
- Developed at Sony Pictures Imageworks as its internal render farm manager (“Cue3”); collaboration with Google Cloud to release as OpenCue in January 2019.
- Fully featured render manager for media and entertainment that can be used to break down complex jobs into individual tasks.
- Contributors include Imageworks, Google, Netflix, Microsoft, Amazon.
- Monthly releases over the past year, including adding Python 3 compatibility, Windows support, new documentation.



Images from *Solo: A Star Wars Story*. © and TM Lucasfilm Ltd. All Rights Reserved.



# OpenEXR

[openexr.org](http://openexr.org)

- Joined ASWF in April 2019; adopted status in Nov. 2019.
- Developed by ILM in 1999; first release of a major open source project by a studio.
- High dynamic-range (HDR) image file format for high-quality image processing and storage; widely adopted standard in computer graphics.
- Academy Technical Achievement Award recipient.
- Key contributors include ILM, Disney Animation, Imageworks, Epic Games, Weta Digital, Pixar, Autodesk, and DreamWorks.
- OpenEXR 3.0 just released.



OpenTimelineIO used on Coco  
for transitions and linking  
media to the latest renders.

Image courtesy of Pixar Animation Studios.



# OpenTimelineIO

[opentimeline.io](http://opentimeline.io)

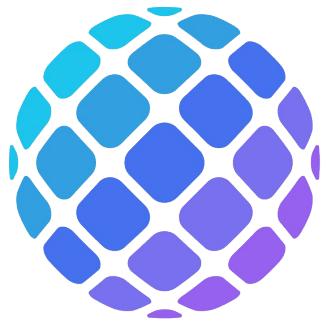
- Joined ASWF in July 2019.
- Developed by Pixar Animation Studios.
- Open source interchange format for editorial timeline information – clips, timing, tracks, transitions, metadata etc.
- Key contributors include Pixar, Netflix, DreamWorks, Autodesk.
- In Public Beta



*The Angry Birds Movie 2*; courtesy of Imageworks



*Spider-Man: Far From Home*; courtesy of Imageworks



open shading language

[openshadinglanguage.org](http://openshadinglanguage.org)

- Joined ASWF in April 2020.
- Developed by Sony Pictures Imageworks; released as open source in 2010.
- De facto standard shading language for VFX and animation, ideal for describing materials, lights, displacement, and pattern generation.
- Academy Technical Achievement Award recipient.
- Key contributors include Imageworks, Animal Logic, NVIDIA, Pixar, DNEG, Autodesk.

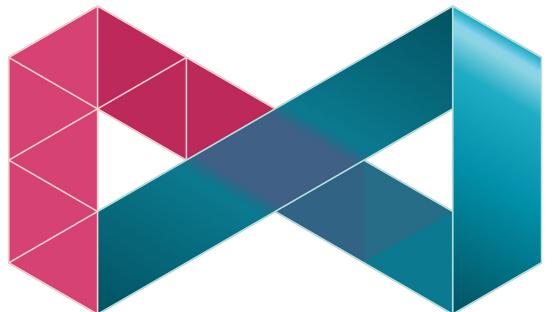
ILM Production tests using  
MaterialX



ILM UNIFIED



STANDARD SURFACE



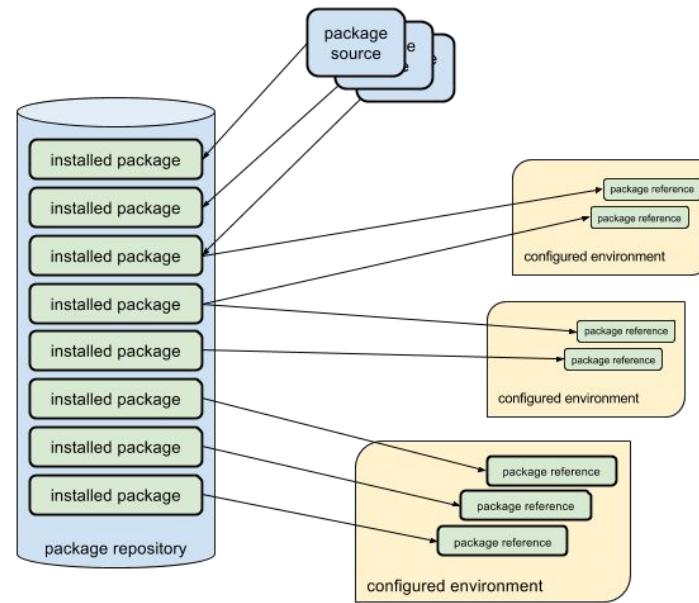
M A T E R I A L X

[materialx.org](https://materialx.org)

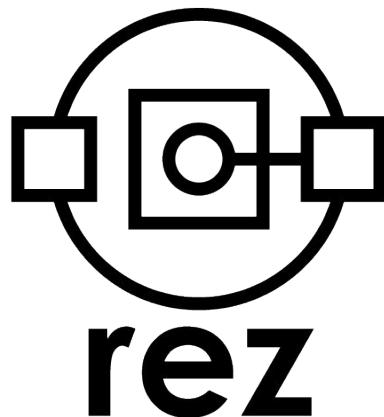
- Joined ASWF in March 2021.
- Open standard for representing rich material and look-development content in computer graphics, enabling its platform-independent description and exchange across applications and renderers.
- Launched at Industrial Light & Magic in 2012, MaterialX has been a key technology in their feature films and real-time experiences since Star Wars: The Force Awakens and Millennium Falcon: Smugglers Run.
- Key contributors include Sony Pictures Imageworks, Pixar, Autodesk, Adobe, and SideFX.



Typical package managers  
install packages into an  
environment



Rez installs packages once,  
and configures environments  
dynamically



[rez-project.io](https://rez-project.io)

- Joined ASWF in February 2022.
- Developed by Allan Johns of Method Studios.
- Cross-platform package manager that leverages a central repository for storing packages instead of installing into each environment separately, reducing the time to create complex environments to just a few seconds.
- Key contributors include Luma Pictures, Method Studios, NVIDIA, and Shotgrid



# rawtoaces

[rawtoaces.org](http://rawtoaces.org)

- Joined ASWF in January 2021.
- Software package that converts digital camera raw files to ACES container files containing image data encoded according to the Academy Color Encoding Specification (ACES) as specified in SMPTE 2065-1.
- Key contributors include AMPAS and Weta Digital



OpenFX Overlay Draw Suite



[openeffects.org](http://openeffects.org)

- Industry-wide common interface between image-based visual effects plugins and host applications
- Used by Autodesk Flame, Foundry Nuke, Blackmagic Design DaVinci Resolve and Fusion, Sony Catalyst and MAGIX Vegas Pro, Assimilate Scratch, Filmlight Baselight, Boris FX Sapphire and Silhouette, RE:Vision Effects and more.
- Open, extensible C API currently version 1.4 with version 1.5 in development.

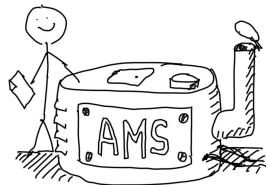


Launching with ASC Standard Evaluation Material II (StEM2), Animal Logic's ALab Phase 2, Intel's Volumetric Clouds Library and AWS character Noa.



[dpel.aswf.io](http://dpel.aswf.io)

Providing a vendor-neutral hosting platform and a uniform license agreement, to encourage, curate and publish production-grade sample assets for developers, researchers and educators, Digital Production Example Library is the conclusion of an Academy Software Foundation working group on assets.



ftrack



# OPENASSETIO

[openassetio.org](http://openassetio.org)



OpenAssetIO is an early stage open source interoperability standard between tools and asset management systems, developed by Foundry with proofs of concept and design input from 15 companies including DNEG, Pixar, Amazon Web Services, Animal Logic, Blizzard, and Blender. OpenAssetIO was the first project to join the Academy Software Foundation in sandbox stage.



DNEG's xSTUDIO



Autodesk's RV Player



[openreviewinitiative.org](http://openreviewinitiative.org)

An open source project with the mission to build a unified toolset for playback, review and approval of motion picture and related professional media, with Autodesk contributing RV, Dneg contributing xSTUDIO, Imageworks contributing parts of itView, and the three companies providing lead architects and maintainers for the project Technical Steering Committee.



Miles Morales (Shameik Moore) and Gwen Stacy (Hailee Steinfeld) take on The Spot (Jason Schwartzman) in Columbia Pictures and Sony Pictures Animation's *SPIDER-MAN™: ACROSS THE SPIDER-VERSE*.



# OpenImageIO

[openimageio.org](http://openimageio.org)

OpenImageIO is a library for reading and writing images, and a bunch of related classes, utilities, and applications. There is a particular emphasis on formats and functionality used in professional, large-scale animation and visual effects work for film. OpenImageIO is used extensively in animation and VFX studios all over the world, and is also incorporated into several commercial products.

# Working Groups

- CI
- Diversity and Inclusion
- Bindings for Rust
- USD

# How to contribute

 Search Academy Software Foundation Need help or have a question? Contact us here

## Contribute to an existing project:

- Submit a PR with a bugfix or new feature
- Pick existing GitHub issue as a sample project
- Integrate with a new app / contribute plugin
- Help improve project documentation
- Submit additional test cases
- Join the TSC discussion: dev mailing list, conf calls

## Get involved with the TAC or Working Group:

- DevOps / CI expertise always useful
- Interest / expertise in security especially welcome
- Join the TAC discussions: mailing list, conf calls, working groups

More information at [tac.aswf.io/engagement](https://tac.aswf.io/engagement)

## Getting Involved in Projects

All of the projects hosted at the Academy Software Foundation are open and transparent, and welcome participation from anyone interested in the technology areas. Each project publishes their governance processes within their project repo ( typically in the README.md file or in a GOVERNANCE.md file within the primary project repo or TSC repo ) on roles within the community and how decision making is made.

### TAC Meetings

Learn more about joining the public meetings of the Technical Advisory Council (TAC) on [the Meetings page](#)

### Mailing Lists and Slack channels for hosted projects

Each project hosted at the Academy Software Foundation collaborates on open channels that are welcome for anyone in the community to participate in. See the below list of channels for each project.

All Slack channels referenced below are part of the [Academy Software Foundation Slack organization](#) unless otherwise noted.



Website: <https://opencolorio.org/>  
Dev Mailing List: <https://lists.aswf.io/g/ocio-dev>  
User Mailing List: <https://lists.aswf.io/g/ocio-user>  
Slack: [slack.opencolorio.org](https://slack.opencolorio.org)  
Leads: Carol Payne - Imaging Technologist at Netflix, Inc



Website: <https://www.openexr.io/>

# How to participate

Developers can join our mailing lists to stay informed about the code and our projects at [lists.aswf.io](https://lists.aswf.io).

Learn how your organization can support the Academy Software Foundation community at [aswf.io/join](https://aswf.io/join).

Stay connected to us on Twitter at @AcademySWF and #ASWF

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**THANK YOU!**  
Learn more at [aswf.io](https://aswf.io)

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