

/\* ACADEMY  
SOFTWARE  
FOUNDATION

# Overview

October 2023

# 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.

/\* ACADEMY  
SOFTWARE  
FOUNDATION

#ASWF

/\* ACADEMY SOFTWARE FOUNDATION

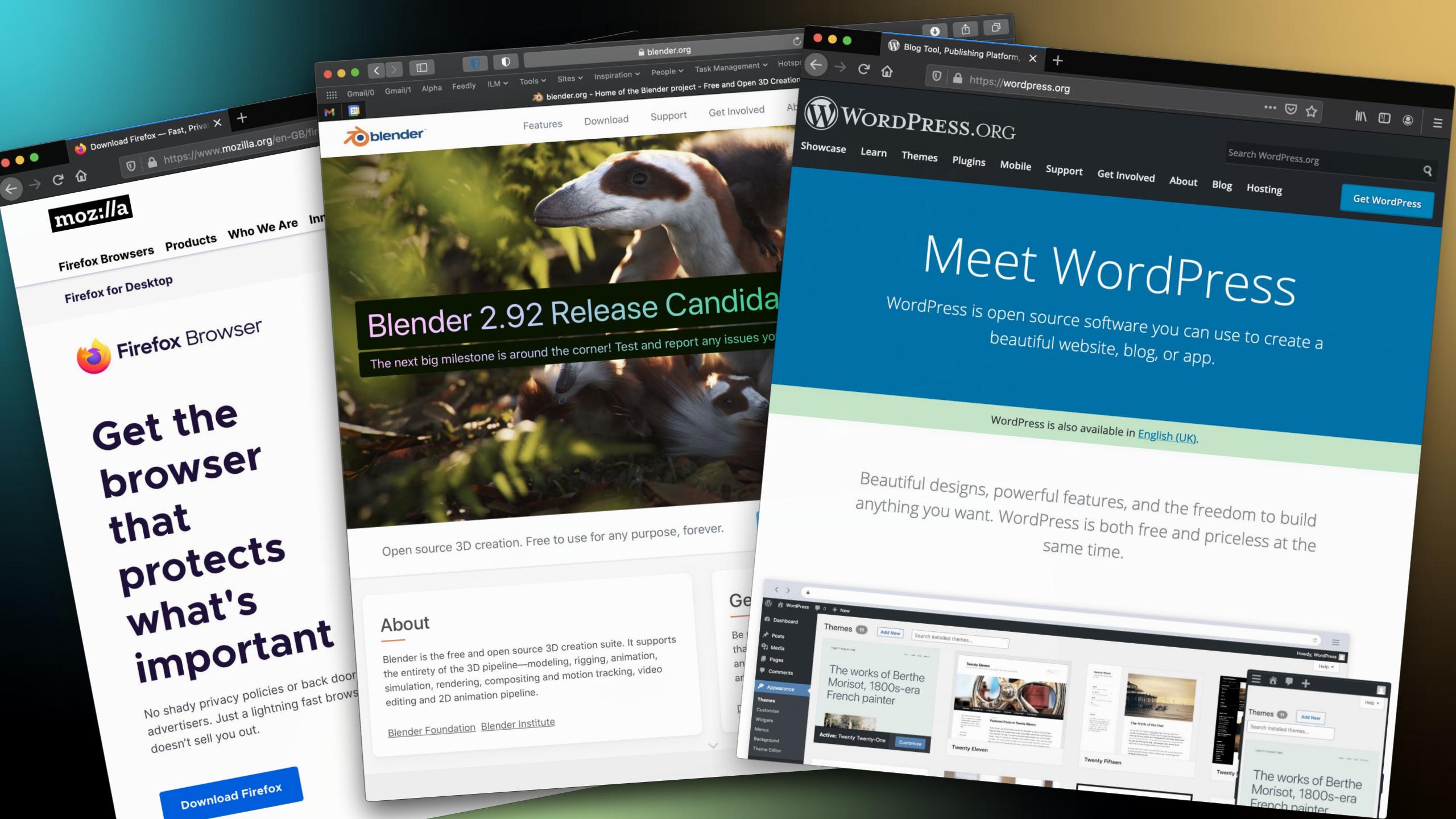
# Why Open Source?

# 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  
Firefox for Desktop

## 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](#)

# 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.

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

/\* ACADEMY  
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**

May 1 2019

**OpenEXR**

**OpenCue**

NVIDIA

ftrack

Red Hat

04

Open Source Day 2019

July 29, 2019

**OpenTimelineIO**

Netflix

Amazon Web Services

Rodeo FX

MovieLabs

Sept. 13, 2019

Apple

Microsoft

05

Open Source Days 2020

August 19-20 2020

Unity Technologies

Conductor

Technologies

SMPTE

April 16 2020

**Open Shading Language**

AMD

DockYard

07

Open Source Days 2021

August 4-5 2021

**MaterialX**

Maxon

10

Dec. 15, 2020

Adobe

ETC

09

Jan. 28 2022

Wevr

11

12

March 10, 2022

**Rez**

**DPEL**

**RawZACES**

Open Source Days 2022

August 8-9, 2022

**OpenFX**

**OpenAssetIO**

**Open Review Initiative**

Canonical

Khronos Group

Open Source Forum 2023

Feb. 16, 2023

HP

Framestore

13

14

15

Open Source Days 2023

July 25 - August 7, 2023

**OpenImageIO**

Otoy

Bolt Graphics

Coreweave



# Membership

## Premier



ACADEMY  
OF MOTION PICTURE  
ARTS AND SCIENCES



Adobe



DREAMWORKS



UNREAL  
ENGINE



NVIDIA®



SONY PICTURES  
imagine



## General



ANIMALLOGIC



BOLT  
GRAPHICS



Canonical



CoreWeave



FRAMESTORE



hp



MAXON



MOD  
TECH  
LABS



otoy



Red Hat



RODEO  
Visual Effects Company



SideFX™



FOUNDRY



Wevr

## Associate



blender



ENTERTAINMENT  
TECHNOLOGY  
CENTER



movie  
labs



SMPTE



KHRONOS®  
GROUP



Visual Effects Society  
VES

# Governing Board Representatives



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



Simon Crownshaw  
Worldwide Media and Entertainment Strategy Director  
Microsoft Corporation



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



Buzz Hays  
Global Lead Entertainment Industry Solutions GCP Google LLC



Chris Hall  
CAD focused Radeon ProRender Solutions Advanced Micro Devices (AMD)



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



Eric Bourque  
VP Content Creation Autodesk



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



Guy Martin  
Director, Open Source & Standards NVIDIA Corporation



Jordan Soles  
VP Technology & Development RodeoFX



Kimball Thurston  
Head of Engineering



Mark Jackels  
Director of Research Development  
DreamWorks Animation



Michael B Johnson  
Innovation Architect, Pro Workflow  
Apple Inc.



Mike Ford  
SVP, Systems Engineering & Software Development  
Sony Pictures Imageworks



Natalya Tatarchuk  
Distinguished Technical Fellow and Chief Architect, VP, Professional Artistry & Graphics Innovation  
Unity Technologies



Paul Salvini  
Global Chief Technology Officer  
DNEG



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



Sean McDuffee  
Graphics Software Engineer  
Intel Corporation



Sebastian Sylwan  
Director of R&D  
Netflix, Inc.



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

# Governing Board Alternates



Alex Wilkie  
Head of R & D  
Animal Logic Pty Ltd



Colette Mullenhoff  
Member, Science and Technology Council  
Academy of Motion Picture Arts and Sciences



Greg Denton  
Senior Program Manager  
Microsoft Corporation



Jay Cherian  
Industry Solutions Architect - Media and Entertainment  
Google LLC



Jordan Thistlewood  
Product Management Director  
Epic Games, Inc



Kevin Sprout  
Director of Developer Relations, Omniverse  
NVIDIA Corporation



Larry Gritz  
Software Architect  
Sony Pictures Imageworks



Laura Reznikov  
none  
Intel Corporation



Mallory King  
Pipeline Td,  
Systems Engineer  
Apple Inc.



Martine Bertrand  
Senior Researcher AI  
DNEG



Michael Min  
Weta Digital Limited



Morgan Pryrocki  
Sr. Strategic Development Manager  
Adobe Inc.



Rachel Rose  
R&D Supervisor  
Industrial Light & Magic



Sean Wallitsch  
Solutions Architect  
Amazon Web Services, Inc.



Tony Micilotta  
Senior Director,  
Content Creation  
Engineering  
Autodesk

# Technical Advisory Council (TAC)



Kimball Thurston  
**Chair**  
Head of  
Engineering  
Weta Digital Ltd



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.



Esteban Papp  
Principal Engineer  
Amazon Web  
Services, Inc.



Gordon Bradley  
Senior Software  
Architect  
Autodesk



Greg Denton  
Senior Program  
Manager  
Microsoft  
Corporation



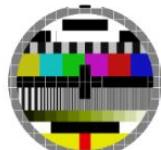
Jean-Francois  
Panisset  
Consulting  
Engineer  
Visual Effects  
Society



Jean-Michel  
Dignard  
LEAD  
PROGRAMMER  
Epic Games, Inc



Jonathan Stone  
Lead Rendering  
Engineer,  
Materials and  
Shading  
Lucasfilm



Joshua Minor  
Sr Lead Software  
Engineer  
Pixar Animation  
Studios



Ken Museth  
Senior Director,  
Simulation  
Technology  
NVIDIA  
Corporation



Larry Gritz  
Software Architect  
Sony Pictures  
Imageworks



Mark Visser  
Sr. Manager  
Engineering, M&E  
Unity  
Technologies



Matthew Low  
Senior Software  
Engineer  
DreamWorks  
Animation



Michael B  
Johnson  
Innovation  
Architect, Pro  
Workflow  
Apple Inc.



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



Sean McDuffee  
Graphics  
Software  
Engineer  
Intel Corporation



Sean O'Connell  
Member of  
Technical Staff  
Software  
Engineer  
Advanced Micro  
Devices (AMD)



Tony Micilotta  
Director, Product  
Development  
DNEG

# 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)

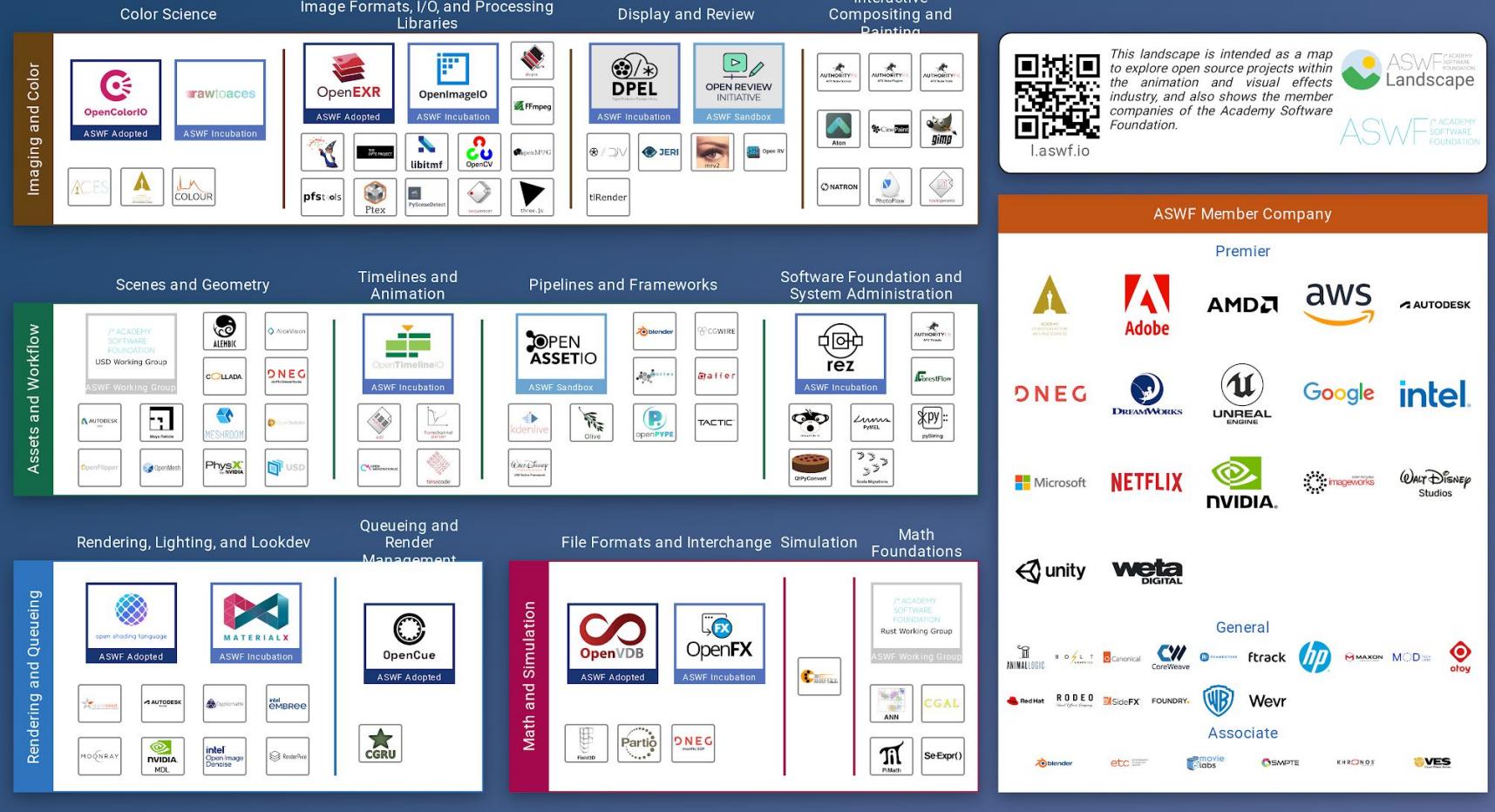
# ASWF Landscape

Academy Software Foundation Landscape

1.0

See the interactive landscape at [l.aswf.io](https://laswf.io)

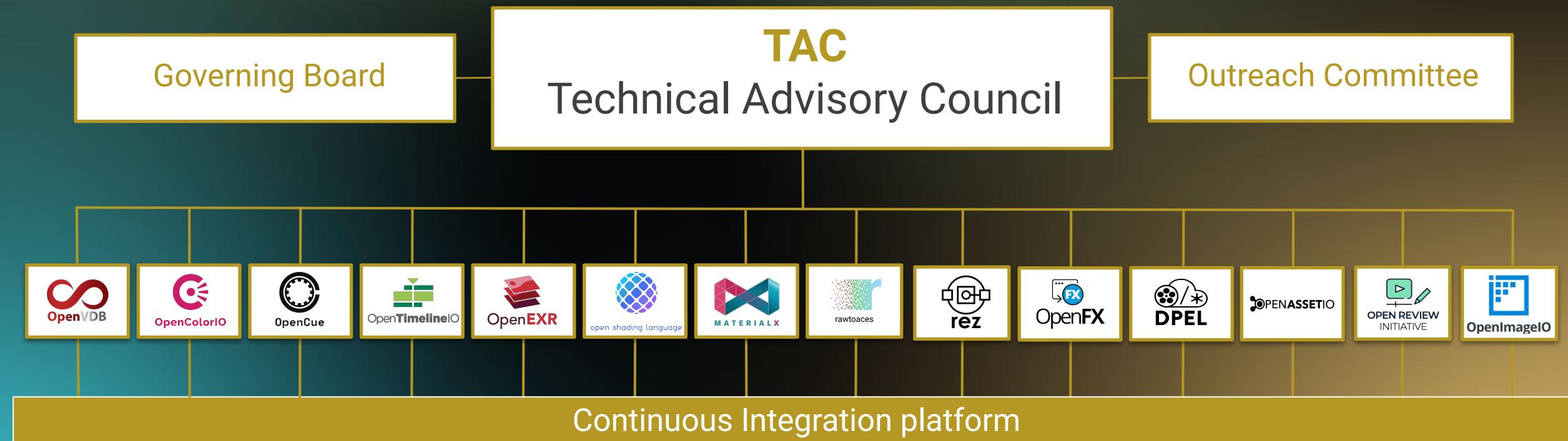
Greyed logos are not open source



## [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)

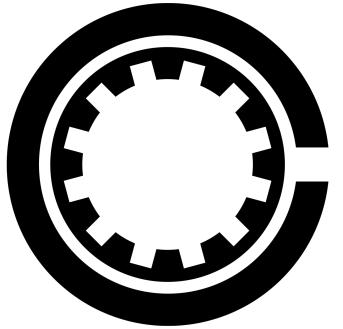


Spider-Man™: Into the Spider-Verse; all images courtesy of Imageworks

- 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.

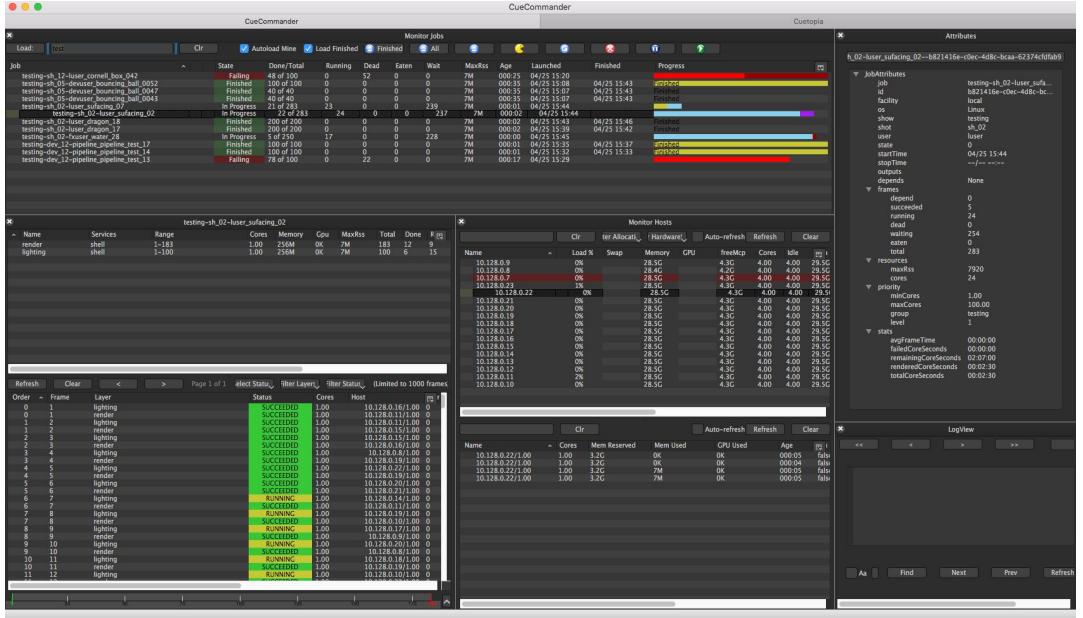


Smurfs: The Lost Village; courtesy of Sony Pictures Imageworks



# 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)

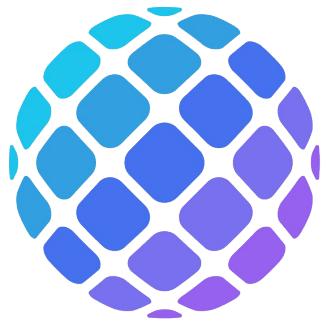
- Joined ASWF in July 2019.
- Developed by Pixar Animation Studios.
- Open source interchange format for editorial timeline information – clips, timing, tracks, transitions, metadata etc.
- Key contributors include Pixar, Netflix, DreamWorks, Autodesk.
- In Public Beta



*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.

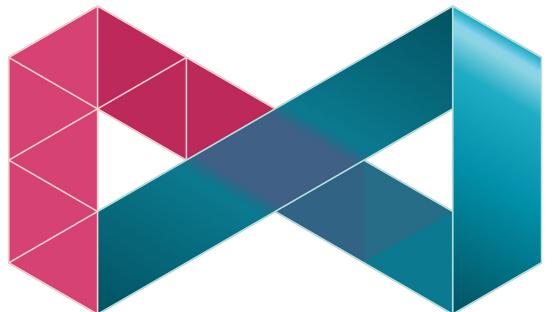
ILM Production tests using  
MaterialX



ILM UNIFIED



STANDARD SURFACE



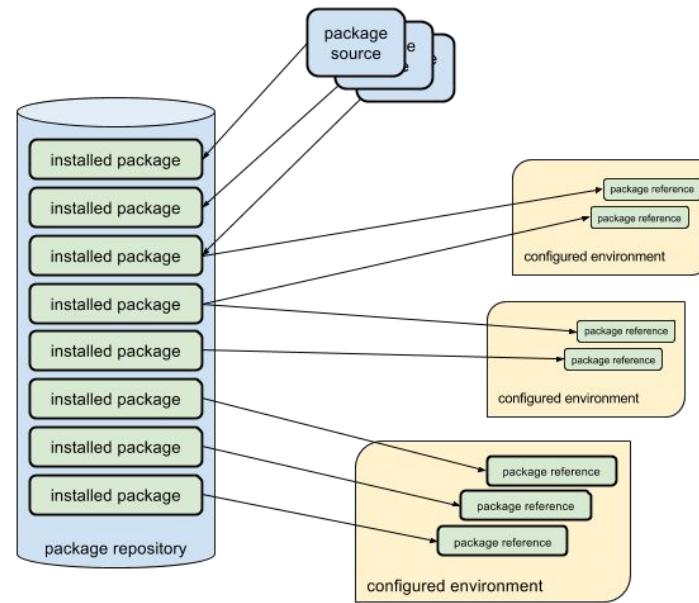
M A T E R I A L X

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

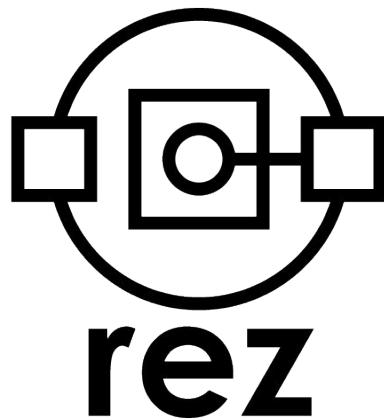
- Joined ASWF in March 2021.
- Open standard for representing rich material and look-development content in computer graphics, enabling its platform-independent description and exchange across applications and renderers.
- Launched at Industrial Light & Magic in 2012, MaterialX has been a key technology 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](http://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.

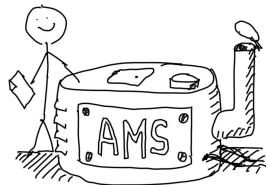


Launching with ASC Standard Evaluation Material II (StEM2), Animal Logic's ALab Phase 2, Intel's Volumetric Clouds Library and AWS character Noa.



[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



**OPEN REVIEW  
INITIATIVE**

[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

/\* ACADEMY  
SOFTWARE  
FOUNDATION

**THANK YOU!**

Learn more at [aswf.io](https://aswf.io)

#ASWF

/\* ACADEMY SOFTWARE FOUNDATION