

/* ACADEMY
SOFTWARE
FOUNDATION

Overview

June 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. 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

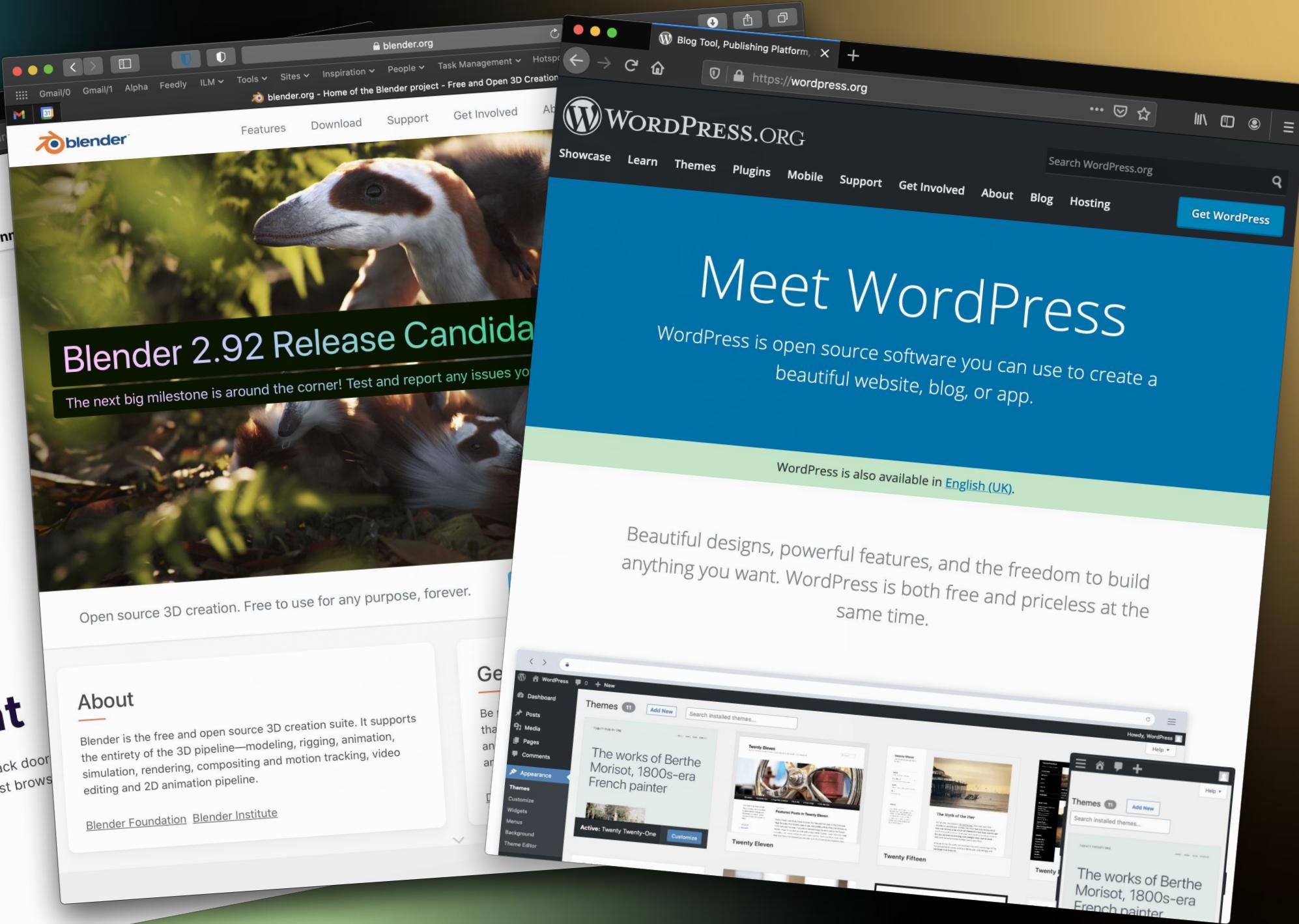
Open Source Projects

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 brows doesn't sell you out.

[Download Firefox](#)



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

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

06

Dec. 15, 2020

Adobe ETC

07

08

09

10

11

12

Open Source Forum 2022

March 10, 2022

Rez

DPEL

Raw2ACES

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

Open Source

Forum 2024

Feb. 22, 2024

Mod Tech Labs

Open Source Days 2023

July 25 -
August 7, 2023

[OpenImageIO](#)

Otoy

Bolt Graphics

Coreweave

Open Source

Forum 2024

Feb. 22, 2024

Mod Tech Labs



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14

15

16

Open Source Days 2021

August 4-5 2021

MaterialX

Maxon

10

Jan. 28 2022

Wevr

11

12

13

14

15

16

\$1M/
year

COVID
19



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Netflix

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Rodeo FX

Membership

Premier



ACADEMY
OF MOTION PICTURE
ARTS AND SCIENCES



General



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
Wētā FX 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



Sébastien 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



Greg Denton
Senior Program Manager
Microsoft Corporation



Jay Cherian
Industry Solutions Architect - Media and Entertainment
Google LLC



Kevin Sprout
Director of Developer Relations, Omniverse
NVIDIA Corporation



Larry Gritz
Software Architect
Sony Pictures Imageworks



Mallory King
Pipeline Td, Systems Engineer
Apple Inc.



Martine Bertrand
Senior Researcher AI
DNEG



Milind Damle
Advanced Micro Devices (AMD)



Morgan Pryrocki
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
Wētā FX Limited



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



Diego Tavares da Silva
Software Engineer
Sony Pictures Imageworks



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



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



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
Vice Chair
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



Neville Spiteri, Wevr



Aliza Carpio, Autodesk



Tram Le-Jones, ftrack



Simon Yuen, NVIDIA



Karthik Iyer, Student Developer



Rebecca Bever, Marvel Studios



Bridgette Powell, ILM



David Aguilar, Disney Animation



Christina Tempelaar-Lietz, Epic Games



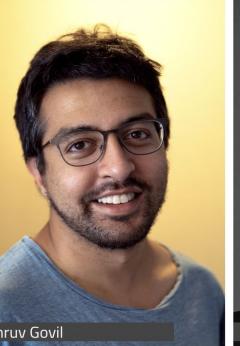
Sean McDuffee, Intel



Shabnam Abbarin, Sony Pictures Imageworks



Susan Salituro, Pixar



Dhruv Govil



Sean Cooper, DNEG



Robin Rowe, CinePaint



Rachel Rose, ILM



Sean Looper, AWS



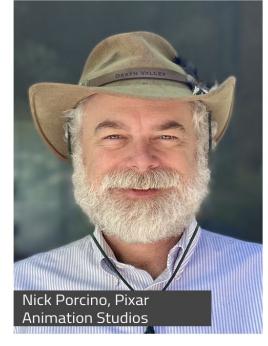
Mei Chu, Sony Pictures Imageworks



Cary Phillips, Industrial Light & Magic



Brian Cipriano, Google



Nick Porcino, Pixar Animation Studios



Jeff Lait, SideFX



Larry Gritz, Sony Pictures Imageworks



Ken Museth, NVIDIA



Carmen Pinto, Foundry



Michael Dolan, Epic Games



Bill Ballew, DreamWorks Animation



Carol Payne, Netflix



Jean-Francois Panisset, Consultant



Pilar Molina Lopez, Blue Sky Studios

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

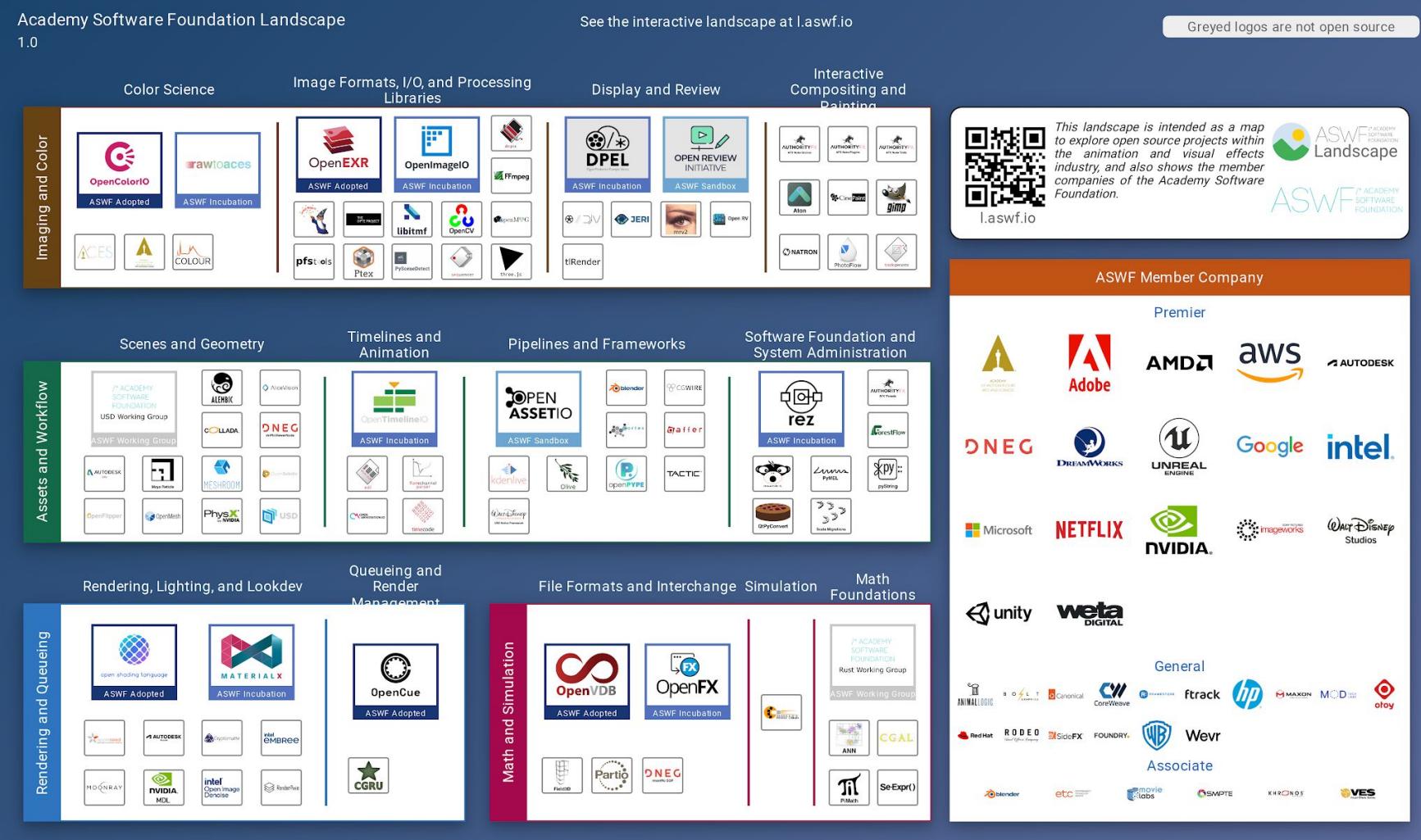
Diversity & Inclusion

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

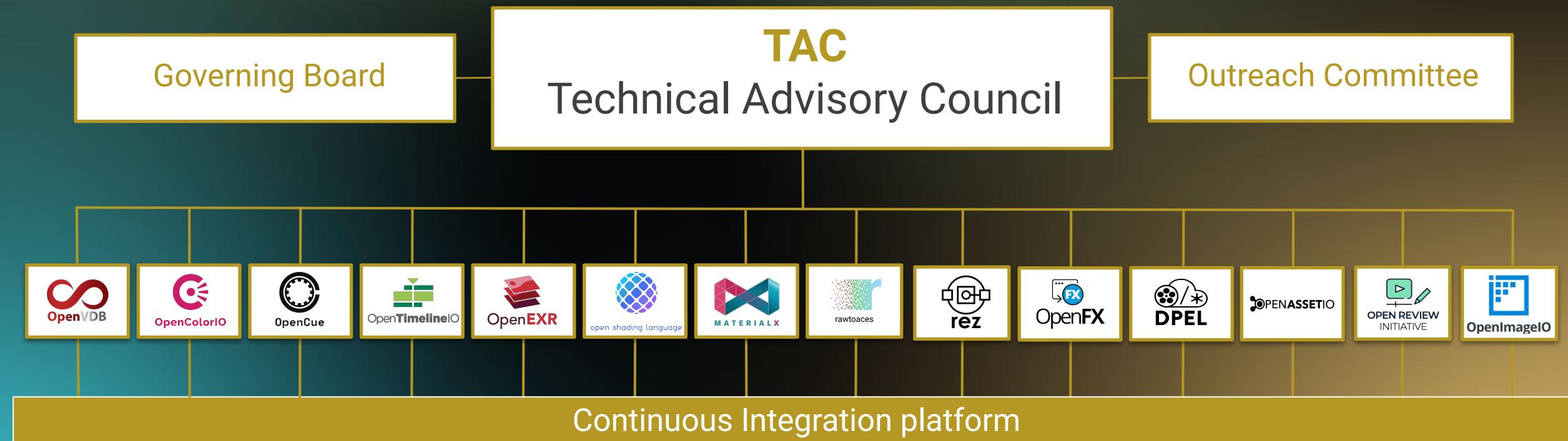
ASWF Landscape



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



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

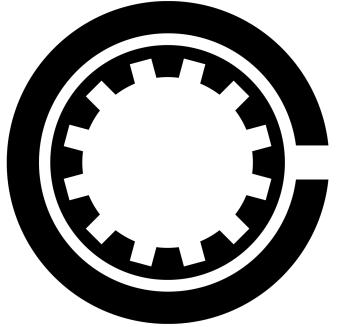


Spider-Man™: Into the Spider-Verse; all images courtesy of Imageworks

- 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.

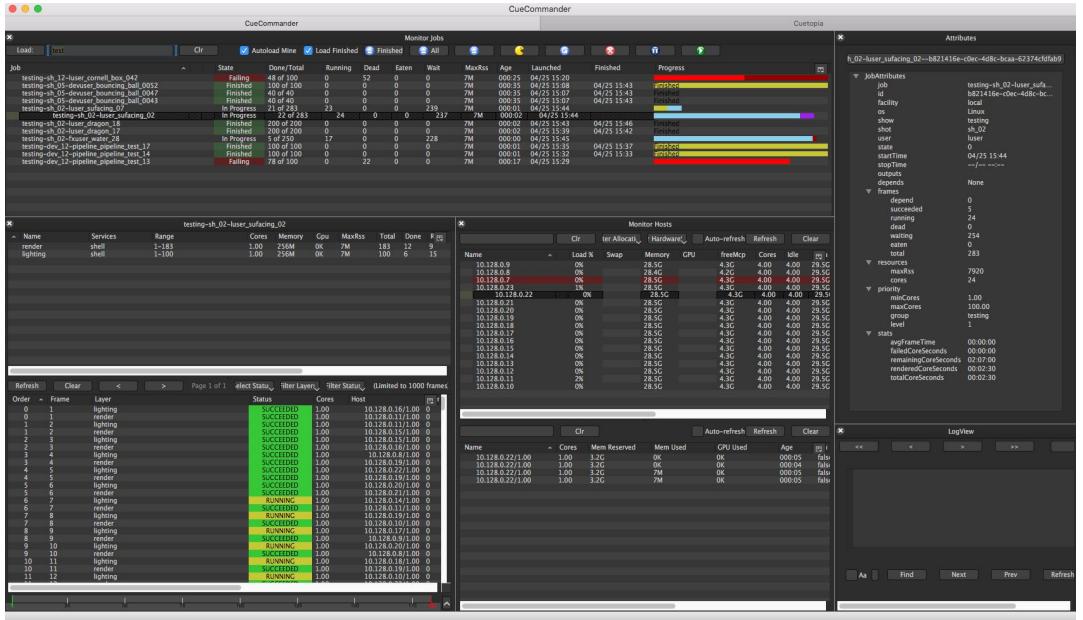


Smurfs: The Lost Village; courtesy of Sony Pictures Imageworks



OpenCue

opencue.io



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

- 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

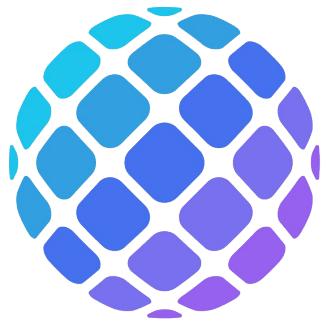
- Joined ASWF in July 2019.
- Developed by Pixar Animation Studios.
- Open source interchange format for editorial timeline information – clips, timing, tracks, transitions, metadata etc.
- Key contributors include Pixar, Netflix, DreamWorks, Autodesk.
- In Public Beta



The Angry Birds Movie 2; courtesy of Imageworks



Spider-Man: Far From Home; courtesy of Imageworks



open shading language

openshadinglanguage.org

- 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.

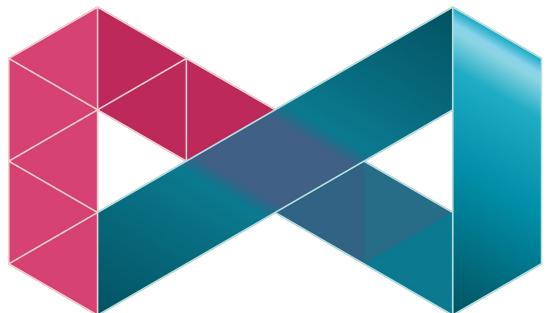
ILM Production tests using
MaterialX



ILM UNIFIED



STANDARD SURFACE



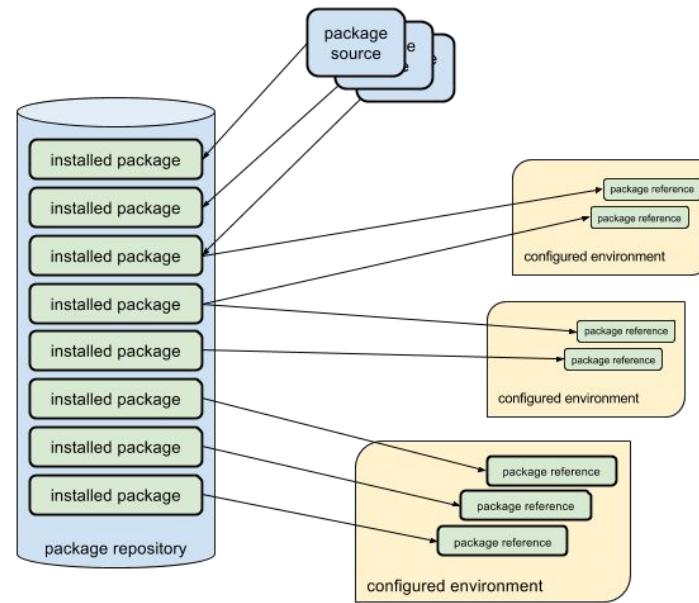
M A T E R I A L X

materialx.org

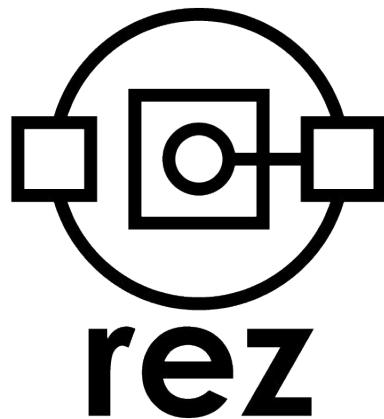
- Joined ASWF in March 2021.
- Open standard for representing rich material and look-development content in computer graphics, enabling its platform-independent description and exchange across applications and renderers.
- Launched at Industrial Light & Magic in 2012, MaterialX has been a key technology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

- 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

- 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



- 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.

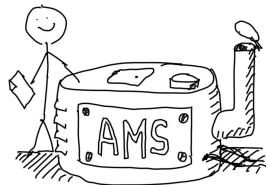


Launching with ASC Standard Evaluation Material II (StEM2), Animal Logic's ALab Phase 2, Intel's Volumetric Clouds Library and AWS character Noa.



dpel.aswf.io

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



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

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

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
- Zero Trust

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

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
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.

Learn how your organization can support the Academy Software Foundation community at aswf.io/join.

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

/* ACADEMY
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#ASWF

THANK YOU!
Learn more at aswf.io

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