

# ATHENA

## Christian Doppler (CD) Laboratory

# Seven Years of Adaptive Streaming Research

## 2019 – 2026

Christian Doppler Laboratory for Adaptive Streaming over HTTP and Emerging Networked Multimedia Services

University of Klagenfurt · Bitmovin · Christian Doppler Research Association

**Closing Symposium · 7 October 2026**



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# ATHENA at a glance

**190+**
Publications

**9**
PhD graduates, 4 more by end of 2026

**32**
International collaborators

**16**
Countries

**36**
Scientific events and special issues organized

**21**
Open datasets and tools

# 36 scientific events and special issues

## 17 Workshops and conferences

ViSNext 2021, ACM CoNEXT
SMS 2021, ACM MobiSys
MPEG AG 5 Immersive Media Quality 2021
MHV 2022, ACM Mile-High Video
IXR 2022, ACM MM
ViSNext 2022, ACM CoNEXT
GMSys 2023, ACM MMSys
IXR 2023, ACM MM
GMSys 2024, ACM MMSys
LIVES 2024, IEEE ICME
MHV 2025, ACM Mile-High Video
LIVES 2025, IEEE ICME
EMS 2025, ACM SIGCOMM
Health and Medicine 2025, ACM MM
VCIP 2025, hosted in Klagenfurt
P3DMM 2026, IEEE ICME
EMS 2026, ACM CoNEXT

## 6 Tutorials

IEEE VCIP 2021
IEEE ICME 2023
IEEE VCIP 2023
IEEE ICME 2025
ACM MM 2025
ACM SIGCOMM 2025

## 4 Special issues

ACM TOMM
IEEE Network
Pattern Recognition
JVCIR

## 7 Special sessions

PCS 2021
EUVIP 2022
IEEE ICME 2023
EUSIPCO 2024
IEEE ICME 2025
IEEE ICIP 2026, two sessions

## 2 Grand challenges

IEEE ICIP 2024, video complexity
IEEE ICIP 2024, 360° video SR

# Our PhD graduates

HA

**Hadi Amirpour**

**2022**

*Plenoptic Content Compression, Transmission, and Quality Evaluation*

EÇ

**Ekrem Çetinkaya**

**2023**

*Video Coding Enhancements for HTTP Adaptive Streaming Using Machine Learning*

JA

**Jesús Aguilar Armijo**

**2023**

*Multi-access Edge Computing for Adaptive Video Streaming*

AE

**Alireza Erfanian**

**2023**

*Optimizing QoE and Latency of Live Video Streaming Using Edge Computing and In-Network Intelligence*

MN

**Minh Nguyen**

**2023**

*Policy-driven Dynamic HTTP Adaptive Streaming Player Environment*

RF

**Reza Farahani**

**2023**

*Network-Assisted Delivery of Adaptive Video Streaming through CDN, SDN and MEC*

VM

**Vignesh V Menon**

**2024**

*Content-adaptive Video Coding for HTTP Adaptive Streaming*

BT

**Babak Taraghi**

**2024**

*End-to-end Quality of Experience Evaluation for HTTP Adaptive Streaming*

DL

**Daniele Lorenzi**

**2026**

*QoE- and Energy-Aware Content Consumption for HTTP Adaptive Streaming*

# Finishing their PhD by the end of 2026

EA

**Emanuele Artioli**

*Generative AI and machine learning for video streaming*

MG

**Mohammad Ghasempour**

*Compressed-domain video processing and energy-aware encoding*

YW

**Yiying Wei**

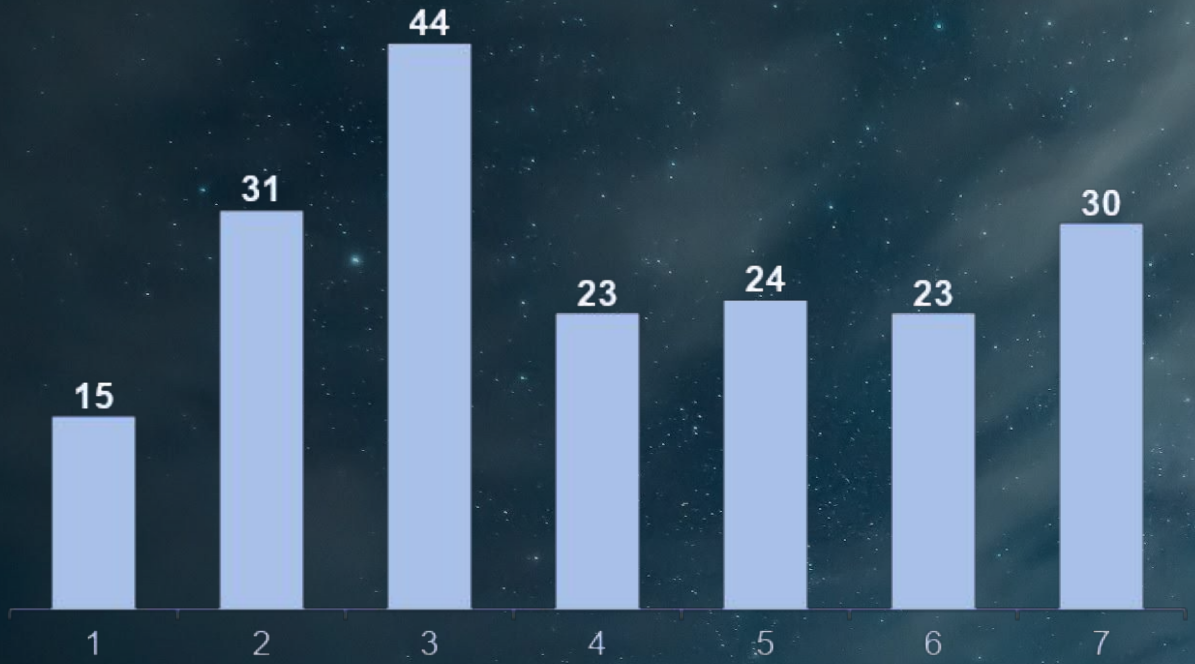
*Deep learning for video compression and streaming*

KQ

**Kamran Qureshi**

*Video compression and immersive media delivery*

# 190 publications




**44**

papers in 2022, the peak year

Journals, conferences and workshops across networking, multimedia and signal processing

# Where our work was published




ATHENA · Christian Doppler Laboratory · 2019–2026

Size reflects the number of ATHENA publications per venue

# Awards and recognition

## Emmy® Award

Bitmovin, 2021
Christian Timmerer, 2022

*Recognition for advancing online video streaming*

- **Best Paper Award**
  QoMEX 2020
- **Best New Streaming Innovation Award**
  IEEE Open Journal of Signal Processing, 2021
- **Best Doctoral Symposium Paper Award**
  ACM MMSys 2021
- **2nd Best Paper Award**
  IFIP/IEEE PEMWN 2021
- **Best Student Paper Award**
  NAB BEIT 2025
- **Patent granted**
  Content-adaptive encoder preset prediction for adaptive live streaming, 2025

# 17 workshops and conferences we co-organized

| 2021 | 2022 | 2023 | 2024 | 2025 | 2026 |
|---|---|---|---|---|---|
| **ViSNext**<br>ACM CoNEXT | **MHV**<br>Mile-High Video | **GMSys**<br>ACM MMSys | **GMSys**<br>ACM MMSys | **MHV**<br>Mile-High Video | **P3DMM**<br>IEEE ICME |
| **SMS**<br>ACM MobiSys | **IXR**<br>ACM MM | **IXR**<br>ACM MM | **LIVES**<br>IEEE ICME | **LIVES**<br>IEEE ICME | **EMS**<br>ACM CoNEXT |
| **MPEG AG 5**<br>Immersive media | **ViSNext**<br>ACM CoNEXT | | | **EMS**<br>ACM SIGCOMM | |
| | | | | **MCHM**<br>ACM MM | |
| | | | | **VCIP**<br>Klagenfurt | |

# Shaping the research community

## 6
### Tutorials

VCIP 2021
ICME 2023
VCIP 2023
ICME 2025
ACM MM 2025
ACM SIGCOMM 2025

## 7
### Special sessions

PCS 2021
EUVIP 2022
ICME 2023
EUSIPCO 2024
ICME 2025
ICIP 2026 (two sessions)

## 4
### Journal special issues

ACM TOMM
IEEE Network
Pattern Recognition
JVCIR

## 2
### Grand challenges

ICIP 2024 on video complexity
ICIP 2024 on 360° video super-resolution

# 32 collaborators in 16 countries

**Canada**
Concordia · Calgary · ÉTS

**USA**
Meta · UChicago · Rutgers · VCU · Tencent

**UK**
Synamedia · MSK AI

**Ireland**
Trinity College Dublin

**France**
Nantes University · Inria

**Belgium**
Ghent University

**Netherlands**
CWI

**Germany**
TU Ilmenau

**Spain**
IMDEA Networks

**Denmark**
Aalborg University

**Austria**
AIT

**Türkiye**
Özyeğin · Ege University

**China**
SWJTU · Guangzhou · Beijing Jiaotong

**Singapore**
NUS

**Iran**
Sharif University

**UAE**
Technology Innovation Institute

# Our international collaborators

**Abdelhak Bentaleb**
Concordia University, Canada

**Ali Ak**
Nantes University, France

**Ali C. Begen**
Özyeğin University, Türkiye

**Anil Kokaram**
Trinity College Dublin, Ireland

**Cagri Ozcinar**
MSK AI, UK

**Cristian J. Vaca Rubio**
Aalborg University, Denmark

**Filip De Turck**
Ghent University, Belgium

**Gwendal Simon**
Synamedia, UK

**Hannaneh B. Pasandi**
Virginia Commonwealth Univ., USA

**Hongjie He**
Southwest Jiaotong Univ., China

**Ioannis Katsavounidis**
Meta, USA

**Irene Viola**
CWI, Netherlands

**Jeroen van der Hooft**
Ghent University, Belgium

**Junchen Jiang**
University of Chicago, USA

**Lingfeng Qu**
Guangzhou University, China

**Mahdi Dolati**
Sharif University, Iran

**Maria Torres Vega**
Ghent University, Belgium

**Mea Wang**
University of Calgary, Canada

**Müge Sayıt**
Ege University, Türkiye

**Nakisa Shams**
ÉTS Montréal, Canada

**Patrick Le Callet**
Nantes Université, France

**Raimund Schatz**
AIT, Austria

**Roger Zimmermann**
NUS, Singapore

**Rongrong Ni**
Beijing Jiaotong Univ., China

**Sergey Gorinsky**
IMDEA Networks, Spain

**Shan Liu**
Tencent, USA

**Stephanie Arévalo Arboleda**
TU Ilmenau, Germany

**Thomas Maugey**
Inria, France

**Tim Wauters**
Ghent University, Belgium

**Wassim Hamidouche**
TII, UAE

**Yao Liu**
Rutgers University, USA

**Yuan Yuan**
Southwest Jiaotong Univ., China

# 21 open datasets and tools

*Shared with the community for reproducible research*

| | | | |
|---|---|---|---|
| VCA | VCD | EVCA | CAdViSE |
| LLL-CAdViSE | COCONUT | GREEM | VEED |
| MVCD | ODVista | Nature-1k | LMM-10K |
| YTLive | DoFP+ | MoViDNN | 8K Multi-Codec DASH |

# Related funded projects

## APOLLO

**FFG Basisprogramm**

2019–2022, with Bitmovin

## GAIA

**FFG Basisprogramm**

2022–2024, with Bitmovin

## SPIRIT

**Horizon Europe**

2022–2025, immersive telepresence

## HoloSense

**Ada Lovelace Programme**

Holographic content streaming

## DORBINE

**FFG**

2025–2028, with AIR6 SYSTEMS

## ForestScope

**Karl Popper Kolleg**

2025–2028, with NES and IST

# Standards, outreach and media

**5**

## Standards bodies

MPEG
JPEG
Metaverse Standards Forum
Qualinet
VQEG

**4**

## Public outreach

Long Night of Research 2022, 2024 and 2026
IEEE ComSoc Virtual Distinguished Lecture 2021

**20+**

## Press items

Der Standard
Die Presse
Kleine Zeitung
Futurezone
Kronen Zeitung and more

# Thank you

to the Christian Doppler Research Association, Bitmovin, the University of Klagenfurt, and every student, collaborator and partner who made ATHENA possible.



ATHENA

Christian Doppler (CD) Laboratory