



6th New Trends in Image Restoration and Enhancement

Workshop and 11 Associated Challenges

19.06.2021, Nashville, US

<https://data.vision.ee.ethz.ch/cvl/ntire21/>



Follow CVPR guidelines and use NTIRE landing page for virtual attendance:

<http://cvpr2021.thecvf.com/>

Use NTIRE21 page for schedule, info, updates:

<https://data.vision.ee.ethz.ch/cvl/ntire21/>

NTIRE 2021 Organizers



Radu Timofte, ETH Zurich,
Luc Van Gool, KU Leuven & ETH Zurich,
Ming-Hsuan Yang, University of California at Merced & Google,
Kyoung Mu Lee, Seoul National University,
Eli Shechtman, Creative Intelligence Lab at Adobe Research,
Martin Danelljan, ETH Zurich,
Shuhang Gu, OPPO & University of Sydney,
Seungjun Nah, Seoul National University,
Sanghyun Son, Seoul National University,
Suyoung Lee, Seoul National University,
Ruofan Zhou, EPFL,
Majed El Helou, EPFL,
Sabine Süsstrunk, EPFL,
Lei Zhang, Alibaba & Hong Kong Polytechnic University

Michael Brown, York University
Goutam Bhat, ETH Zurich
Chao Dong, SIAT
Cosmin Ancuti, UCL
Codruta Ancuti, University Politehnica Timisoara
Eduardo Perez Pellitero, Huawei Noah's Ark Lab
Ales Leonardis, Huawei Noah's Ark Lab & University of Birmingham
Oliver Nina, AF Research Lab
Abdullah Abuolaim, York University
Jimmy Ren, SenseTime
Andreas Lugmayr, ETH Zurich
Bob Lee, Wright Brothers Institute
Jinjin Gu, SNU
Ren Yang, ETH Zurich

NTIRE 2021 in numbers:



6th	Edition
28	Organizers
85	PC Members
331	Reviews
70	Accepted Papers
32	Oral Presentations
11	Associated Challenges
2000+	Registered Participants in Challenges
5	Invited Talks
7	Sponsors

NTIRE 2021 Sponsors



NTIRE 2021 Associated Challenges



- Defocus Deblurring using Dual-Pixel Images
 - Depth Guided Image Relighting (2 tracks)
 - Perceptual Image Quality Assessment
 - Image Deblurring (2 tracks)
 - Multi-Modal Aerial View Imagery Classification (2 tracks)
 - Learning the Super-Resolution Space (2 tracks)
 - NonHomogeneous Dehazing
 - Enhancement of Compressed Videos (3 tracks)
 - Video Super-Resolution (2 tracks)
 - Burst Super-Resolution (2 tracks)
 - High Dynamic Range (2 tracks)
-
- 20 competitions (16 on *Codalab platform*)
 - 3000+ participants, 200+ teams competed in the final test phase

<https://data.vision.ee.ethz.ch/cvl/ntire21/>

NTIRE 2021 Challenge on Defocus Deblurring using Dual-Pixel Images

- One competition track
-
- Novel dataset, 600 scenes
- (Abuolaim and Brown, ECCV 2020)
- 180+ participants
- 9 team entries in the final evaluation



*Find more details from the **challenge report** and the **presentation***

<https://data.vision.ee.ethz.ch/cvl/ntire21/>

NTIRE 2021 Challenge on Depth Guided Image Relighting

- Two competitions/tracks:
 - one-to-one
 - any-to-any
- VIDIT dataset augmented with depth info (El Helou et al., 2020)
- 250 participants
- 18 team entries in the final test phase



*Find more details from the **challenge report** and the **presentation***

<https://data.vision.ee.ethz.ch/cvl/ntire21/>

NTIRE 2021 Challenge on Perceptual Image Quality Assessment

- One competition
- PIPAL dataset augmented
(Gu et al., ECCV 2020)
- 270 participants
- 13 team entries in the final test phase



*Find more details from the **challenge report** and the **presentation***

<https://data.vision.ee.ethz.ch/cvl/ntire21/>

NTIRE 2021 Challenge on Image Deblurring

- Two competitions/tracks:
 - Low resolution
 - JPEG artifacts
- REDS dataset
(Nah et al., CVPRW 2019)
- 330+ participants
- 20+ team entries in the final test phase



*Find more details from the **challenge report** and the **presentation***

<https://data.vision.ee.ethz.ch/cvl/ntire21/>

NTIRE 2021 Challenge on Video Super-Resolution

- Two competitions/tracks:
 - Spatial SR
 - Spatio-Temporal SR
- REDS dataset
(Nah et al., CVPRW 2019)
- 250+ participants
- 14 team entries in the final test phase



*Find more details from the **challenge report** and the **presentation***

<https://data.vision.ee.ethz.ch/cvl/ntire21/>

NTIRE 2021 Challenge on Multi-Modal Aerial View Imagery Classification

- Two competitions/tracks:
 - SAR
 - EO+SAR
- Novel dataset, 10 categories
- 200+ participants
- 15+ team entries in the final test phase



*Find more details from the **challenge report** and the **presentation***

<https://data.vision.ee.ethz.ch/cvl/ntire21/>

NTIRE 2021 Challenge on Burst Super-Resolution

- Two competitions/tracks:
 - Synthetic
 - Real-World
- New dataset (Bhat et al., 2021)
- DIV2K dataset (Agustsson and Timofte, CVPRW 2017)
- 40+ participants
- 6 team entries in the final test phase



*Find more details from the **challenge report** and the **presentation***

<https://data.vision.ee.ethz.ch/cvl/ntire21/>

NTIRE 2021 Challenge on Learning the Super-Resolution Space

- Two competitions/tracks:
 - x4
 - x8
- DIV2K dataset (Agustsson and Timofte, CVPRW 2017)
- 100+ participants
- 11 team entries in the final test phase



*Find more details from the **challenge report** and the **presentation***

<https://data.vision.ee.ethz.ch/cvl/ntire21/>

NTIRE 2021 Challenge on NonHomogeneous Dehazing

- One competition
- NH-HAZE dataset + extra images
(Ancuti et al., CVPRW 2020)
- 320+ participants
- 23 team entries in the final test phase



*Find more details from the **challenge report** and the **presentation***

<https://data.vision.ee.ethz.ch/cvl/ntire21/>

NTIRE 2021 Challenge on Quality Enhancement of Compressed Video

- Three competitions/tracks:
 - Fixed QP, fidelity
 - Fixed QP, perceptual
 - Fixed bit-rate, fidelity
- New LDV dataset – 240 videos in 10 categories (Yang and Timofte, CVPRW 2021)
- 400+ participants
- 20+ team entries in the final test phase



*Find more details from the **challenge report** and the **presentation***

<https://data.vision.ee.ethz.ch/cvl/ntire21/>

NTIRE 2021 Challenge on High Dynamic Range Imaging

- Two competitions / tracks:
 - Single frame
 - Multiple frames
- Novel dataset
 - 1700 examples, LDR \leftrightarrow HDR
- 200+ participants
- 9 team entries in the final test phase



*Find more details from the **challenge report** and the **presentation***

<https://data.vision.ee.ethz.ch/cvl/ntire21/>

NTIRE 2021 Associated Challenges:

reproducibility!

- Reproducibility of results is key
- Winners checked for reproducibility
- All the ranked teams submitted both sources and factsheets
- Focus on real world scenarios



<https://data.vision.ee.ethz.ch/cvl/ntire21/>

66 Awards

- **for top ranking teams in NTIRE 2021 Challenges**
- **money or product prizes for winners, runner-ups, 2nd and (sometimes) 3rd place awards**
(the teams will be contacted by email)
- **certificates**
(will be posted on the NTIRE 2021 webpage)

Congratulations!



NTIRE 2021 Workshop Papers – 70 accepted papers

PST (UTC-7)

- 07:00- 07:50** **oral session for defocus deblurring and dehazing challenges**
- 08:20- 09:20** **oral session for deblurring and learning SR space challenges**
- 09:50- 11:00** **oral session for burst super-resolution challenge and other papers**
- 12:30- 13:10** **oral session for video SR and perceptual IQA challenges**
- 13:40- 15:00** **oral session for relighting, SAR classification, video enhancement challenges**
- 15:30- 16:00** **oral session for High Dynamic Range imaging challenge**



Invited Talks



Alan Bovik
(University of Texas at Austin)

Wangmeng Zuo
(Harbin Institute of Technology)

Rakesh Ranjan, Federico Perazzi
(Facebook Reality Labs)

Ayush Tewari, Christian Theobalt
(MPI Informatics, Saarland University)

Qi Tian
(Huawei Cloud & AI)

PST/UTC

07:50/14:50 **Towards Guided and Generic Blind Face Restoration** (*Prof. Wangmeng Zuo*)

09:20/16:20 **Challenges and Solutions for Intelligent Image Restoration** (*Dr. Qi Tian*)

12:00/19:00 **Getting «High» on Frame Rates** (*Prof. Alan Bovik*)

13:10/20:10 **Enhancing AR Camera using Deep Learning** (*Dr. Ranjan, Dr. Perazzi*)

15:00/22:00 **Synthesis of Portrait Images with 3D Control** (*Dr. Tewari, Prof. Theobalt*)



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- 15:30** *oral session for High Dynamic Range imaging challenge*



NTIRE 2021 Sponsors



Qualcomm
AI research

oppo



Many thanks!



MOBILE AI WORKSHOP

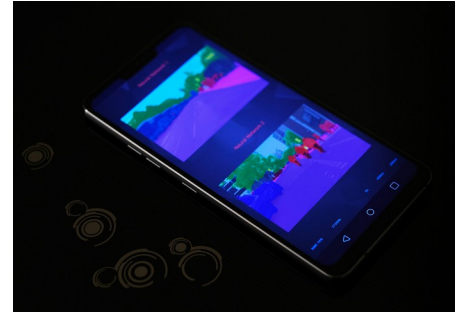
@ CVPR 2021, 20th of June

<https://ai-benchmark.com/workshops/mai/2021/>

and associated **challenges** on topics such as **efficient**:

- learned ISP (powered by MediaTek)
- denoising (powered by Samsung)
- quantized super-resolution (powered by Synaptics)
- video super-resolution (powered by OPPO)
- depth estimation (powered by Raspberry Pi)

Tens of tutorials and keynotes from industry!



AI Witchlabs



HUAWEI



Synaptics™



Raspberry Pi



서울대학교
SEOUL NATIONAL UNIVERSITY

ETH zürich

upcoming

Advances in Image Manipulation (AIM) workshop @ ICCV 2021, 16th of October

<https://data.vision.ee.ethz.ch/cvl/aim21/>

and associated **challenges** on topics such as:

- night photography rendering
- super-resolution
- efficient super-resolution
- quality mapping

Important dates:

- July 1st, start of the challenges
- August 10th, end of the challenges
- August 10th, paper submission deadline



Open positions for PhD students and postdocs

on topics such as:

- restoration, enhancement, manipulation
- computational photography
- learned compression
- efficient architectures
- minimal supervision learning
- augmented / mixed reality

Send your queries and applications to **Radu Timofte**:
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