# Martin Danelljan

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Google Scholar **►**Citations: **23700**. H-index: **45** 

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#### **Academic Positions**

Dec. 2020 - Research Group Leader, Computer Vision Laboratory, ETH Zürich.

present Managing, coordinating, and supervising research conducted by a team of several PhD students.

Jan. 2019 - Postdoctoral Researcher, Computer Vision Laboratory, ETH Zürich.

Nov. 2020 Under Prof. Luc Van Gool. The position includes supervision of several PhD and Master students.

Mar. 2014 - PhD Student in Computer Vision, Computer Vision Laboratory, Linköping University.

Dec. 2018 The position included research, studying related graduate courses ( $\sim 20\%$ ) and teaching ( $\sim 20\%$ ).

Aug. 2013 - Research Engineer and TA, Computer Vision Laboratory, Linköping University.

Mar. 2014 Continued research related to my master's thesis was combined with development of the computer vision component in the *Collaborative Unmanned Aircraft Systems* project (MATLAB and C++).

2012 **Summer Intern**, *Computer Vision Laboratory, Linköping University*. Implementation and extension of a state-of-the-art video stabilization method (C++).

2009 – 2012 **Teaching Assistant**, *Linköping University*.

Teaching assistant in a calculus course and the control theory course.

## Entrepreneurial Experience

Jan. 2022 - Co-founder, Elevate3D.

Now State-of-the-art NeRF-based 3D reconstruction and real-time visualization.

- Sole researcher, developer, and implementation of the core technology (Python, JAX, C++, GLSL).
- Developed novel high-fidelity NeRF-based solution, capable of in-browser on-device real-time rendering, without any meshing, baking, or other post-processing.
- Developed realistic material extraction, for accurate relighting and mesh export.

Oct. 2017 - Co-founder, Singulareye.

Dec. 2018 Consultancy and commercialization of my research within computer vision. Projects:

- Oct. 2017 Dec. 2018: End-to-end design and development of a deep learning based computer vision system for automotive application. Customer: NIRA Dynamics (Linköping).
- Nov. 2017 Dec. 2018: Computer vision solution for a smartphone AR application. Deploying the visual tracking algorithms I developed during my PhD studies. Customer: Just Football.

## Education and Degrees

2014 – 2018 Doctor of Philosophy in Computer Vision, Computer Vision Laboratory, Linköping University.

- My PhD-thesis is titled Learning Convolution Operators for Visual Tracking.
- I received the biennial Best Nordic Thesis Prize for the period 2017-2018 at SCIA 2019.
- My main research interests were machine learning, deep learning and statistical models for computer vision applications, including visual object tracking, segmentation and registration of 3D-data.
- Includes 90 ECTS credits of PhD-level courses within of mathematics, statistics, machine learning, computer vision, and pedagogy.

- 2008 2013 Master of Science in Electrical Engineering, Linköping University, average grade 5.0/5.
  - A five year program in Applied Physics and Electrical Engineering.
  - In the final two years: in-depth courses in signal theory, computer vision, sensor fusion, machine learning, multi-core/GPU programming and mathematics.
  - My master's thesis Visual Tracking was awarded best thesis by the Swedish computer society oral presentation at CVPR 2014.

#### Awards

- 2021 Honorable mention paper award at German Conference on Pattern Recognition (GCPR/DAGM).
- 2020 Among top 12 reviewers for the European Conference on Computer Vision (ECCV).
- 2019 **Best Nordic Thesis Prize** for the period 2017-2018, awarded at SCIA 2019.
- 2019 Best student paper award at the British Machine Vision Conference (BMVC).
- 2016 Best paper award at the International Conference on Pattern Recognition (ICPR).
- 2016 Top rank in the Visual Object Tracking (VOT) Challenge 2016 at the ECCV 2016 VOT workshop.
- 2015 Top rank in the VOT Thermal Infrared Challenge 2015 at the ICCV 2015 VOT workshop.
- 2015 Winner of the OpenCV State-of-the-Art Vision Challenge in Tracking.
- 2014 Winner of the Visual Object Tracking (VOT) Challenge 2014.
- 2014 The Swedish Computer Society award for best master's thesis.
- 2014 The Tryggve Holm medal for outstanding student achievements and grades.

## Organization of Conferences

- 2021-2022 Conference on Computer Vision and Pattern Recognition, CVPR 2022, Area Chair.
- 2021-2022 AAAI Conference on Artificial Intelligence, 2022, Senior Program Committee (Meta-Reviewer).

#### Organized Workshops and Tutorials

- 2023 **VOT 2023: Visual Object Tracking Challenge**, *Co-organizer*, Workshop at ICCV 2023, Paris, France.
- 2023 **QCVML: Quantum Computer Vision and Machine Learning Workshop**, *Co-organizer*, Workshop at CVPR 2023, Vancouver, USA.
- 2022 VOT 2022: Visual Object Tracking Challenge, Co-organizer, Workshop at ECCV 2022, Tel Aviv, Israel.
- 2021 AIM 2021: Advances in Image Manipulation, Co-organizer, Workshop at ICCV 2021, Montreal, Canada (online event).
- 2021 **VOT 2021: Visual Object Tracking Challenge**, *Co-organizer*, Workshop at ICCV 2021, Montreal, Canada (online event).
- 2021 NTIRE 2021: New Trends in Image Restoration and Enhancement, Co-organizer, Workshop at CVPR 2021, USA (online event).
- 2020 AIM 2020: Advances in Image Manipulation, Co-organizer, Workshop at ECCV 2020, Glasgow, UK (online event).
- 2020 **VOT 2020: Visual Object Tracking Challenge**, *Co-organizer*, Workshop at ECCV 2020, Glasgow, UK (online event).
- 2020 NTIRE 2020: New Trends in Image Restoration and Enhancement, Co-organizer, Workshop at CVPR 2020, Seattle, USA (online event).
- 2019 AIM 2019: Advances in Image Manipulation, Co-organizer, Workshop at ICCV 2019, Seoul, South Korea.
- 2019 FIRE: From Image Restoration to Enhancement and Beyond, Co-organizer, Tutorial at ICCV 2019, Seoul, South Korea.
- 2018 Discriminative Correlation Filters for Visual Tracking, Sole organizer, Tutorial at GCPR 2018, Stuttgart, Germany.

## Open Source Projects

☆ 2700 **O PyTracking** 

☆ 500 C ECO

☆ 170 Continuous-ConvOp

#### Supervision

#### Supervised PhD students

2020 – present **Prune Truong**, ETH Zürich.

2021 - present Lei Ke, ETH Zürich.

2021 – present Siyuan Li, ETH Zürich.

2020 - present Matthieu Paul, ETH Zürich.

2019 - present Fredrik K. Gustafsson, Uppsala University.

#### Graduated PhD students

2019 – 2023 Goutam Bhat, ETH Zürich.

2019 – 2022 Andreas Lugmayr, ETH Zürich.

2020 – 2023 Christoph Mayer, ETH Zürich.

2019 – 2023 Ardhendu Shekhar Tripathi, ETH Zürich.

2018 – 2022 Joakim Johnander, Linköping University.

## Languages

Swedish (native), English (fluent), Armenian (spoken)

#### Selected Publications

CVPR 2023 Mask-Free Video Instance Segmentation.

Lei Ke, Martin Danelljan, Henghui Ding, Yu-Wing Tai, Chi-Keung Tang, Fisher Yu. IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2023.

CVPR 2023 OVTrack: Open-Vocabulary Multiple Object Tracking.

Siyuan Li, Tobias Fischer, Lei Ke, Henghui Ding, Martin Danelljan, Fisher Yu. IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2023.

CVPR 2023 Continuous Pseudo-Label Rectified Domain Adaptive Semantic Segmentation with Implicit Neural Representations.

Rui Gong, Qin Wang, Martin Danelljan, Dengxin Dai, Luc Van Gool.

IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2023.

PAMI 2023 PDC-Net+: Enhanced Probabilistic Dense Correspondence Network.

Prune Truong, Martin Danelljan, Radu Timofte, Luc Van Gool.

IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), 2023.

PAMI 2022 Visual Object Tracking with Discriminative Filters and Siamese Networks: A Survey and Outlook.

Sajid Javed, **Martin Danelljan**, Fahad Shahbaz Khan, Muhammad Haris Khan, Michael Felsberg, Jiri Matas

IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), 2022.

BMVC 2022 AVisT: A Benchmark for Visual Object Tracking in Adverse Visibility.

Mubashir Noman, Wafa Al Ghallabi, Daniya Najiha, Christoph Mayer, Akshay Dudhane, **Martin Danelljan**, Hisham Cholakkal, Salman Khan, Luc Van Gool, Fahad Shahbaz Khan. British Machine Vision Conference (**BMVC**), 2022.

ECCV 2022 Dense Gaussian Processes for Few-Shot Segmentation.

Joakim Johnander, Johan Edstedt, Michael Felsberg, Fahad Shahbaz Khan, Martin Danelljan.

European Conference on Computer Vision (ECCV), 2022.

ECCV 2022	Robust Visual Tracking by Segmentation.  Matthieu Paul, Martin Danelljan, Christoph Mayer, Luc Van Gool.  European Conference on Computer Vision (ECCV), 2022.
ECCV 2022	Transform your Smartphone into a DSLR Camera: Learning the ISP in the Wild. Ardhendu Tripathi, Martin Danelljan, Samarth Shukla, Radu Timofte, Luc Van Gool. European Conference on Computer Vision (ECCV), 2022.
ECCV 2022	Tracking Every Thing in the Wild. Siyuan Li, Martin Danelljan, Henghui Ding, Thomas Huang, Fisher Yu. European Conference on Computer Vision (ECCV), 2022.
ECCV 2022	Video Mask Transfiner for High-Quality Video Instance Segmentation. Lei Ke, Henghui Ding, Martin Danelljan, Yu-Wing Tai, Chi-Keung Tang, Fisher Yu. European Conference on Computer Vision (ECCV), 2022.
ECCV 2022	TACS: Taxonomy Adaptive Cross-Domain Semantic Segmentation. Rui Gong, Martin Danelljan, Dengxin Dai, Danda Pani Paudel, Ajad Chhatkuli, Fisher Yu, Luc Van Gool European Conference on Computer Vision (ECCV), 2022.
CVPR 2022 Cited by <b>150</b>	RePaint: Inpainting using Denoising Diffusion Probabilistic Models.  Andreas Lugmayr, Martin Danelljan, Andres Romero, Fisher Yu, Radu Timofte, Luc Van Gool.  IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2022.
CVPR 2022	Mask Transfiner for High-Quality Instance Segmentation.  Lei Ke, Martin Danelljan, Xia Li, Yu-Wing Tai, Chi-Keung Tang, Fisher Yu.  IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2022.
CVPR 2022	Probabilistic Warp Consistency for Weakly-Supervised Semantic Correspondences.  Prune Truong, Martin Danelljan, Fisher Yu, Luc Van Gool.  IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2022.
CVPR 2022	Adiabatic Quantum Computing for Multi Object Tracking.  Jan-Nico Zäch, Alexander Liniger, Martin Danelljan, Dengxin Dai, Luc Van Gool.  IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2022.
CVPR 2022	Transforming Model Prediction for Tracking. Christoph Mayer, Martin Danelljan, Goutam Bhat, Matthieu Paul, Danda Pani Paudel, Fisher Yu, Luc Van Gool. IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2022.
CVPR 2022	Arbitrary-Scale Image Synthesis.  Evangelos Ntavelis, Mohamad Shahbazi, Iason Kastanis, Radu Timofte, Martin Danelljan, Luc Van Gool IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2022.
ICLR 2022	Collapse by Conditioning: Training Class-conditional GANs with Limited Data.  Mohamad Shahbazi, Martin Danelljan, Danda Pani Paudel, Luc Van Gool.  International Conference on Learning Representations (ICLR), 2022.
ICRA 2022	Learnable Online Graph Representations for 3D Multi-Object Tracking.  Jan-Nico Zäch, Dengxin Dai, Alexander Liniger, Martin Danelljan, Luc Van Gool.  International Conference on Robotics and Automation (ICRA), 2022.
NeurIPS 2021 Spotlight, top 3.0%	Prototypical Cross-Attention Networks for Multiple Object Tracking and Segmentation Lei Ke, Xia Li, Martin Danelljan, Yu-Wing Tai, Chi-Keung Tang, Fisher Yu. Conference on Neural Information Processing Systems (NeurIPS), 2021.
ICCV 2021 Oral, top 3.0%	Warp Consistency for Unsupervised Learning of Dense Correspondences.  Prune Truong, Martin Danelljan, Fisher Yu, Luc Van Gool.  IEEE International Conference on Computer Vision (ICCV), 2021.
ICCV 2021 Oral, top 3.0%	Deep Reparametrization of Multi-Frame Super-Resolution and Denoising.  Goutam Bhat, Martin Danelljan, Fisher Yu, Luc Van Gool, Radu Timofte.  IEEE International Conference on Computer Vision (ICCV), 2021.
ICCV 2021	Generating Masks from Boxes by Mining Spatio-Temporal Consistencies in Videos.  Bin Zhao, Goutam Bhat, Martin Danelljan, Luc Van Gool, Radu Timofte.  IEEE International Conference on Computer Vision (ICCV), 2021.
ICCV 2021 Cited by 90	

ICCV 2021 Hierarchical Conditional Flow: A Unified Framework for Image Super-Resolution and Image Rescaling. Jingyun Liang, Andreas Lugmayr, Kai Zhang, Martin Danelljan, Luc Van Gool, Radu Timofte. IEEE International Conference on Computer Vision (ICCV), 2021. ICCV 2021 Scaling Semantic Segmentation Beyond 1K Classes on a Single GPU. Shipra Jain, Danda Pani Paudel, Martin Danelljan, Luc Van Gool. IEEE International Conference on Computer Vision (ICCV), 2021. CVPR 2021 Learning Accurate Dense Correspondences and When to Trust Them. Prune Truong, Martin Danelljan, Luc Van Gool, Radu Timofte. Oral, top 4.0% IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2021. CVPR 2021 DeFlow: Learning Complex Image Degradations from Unpaired Data with Conditional Flows. Oral, top 4.0% Valentin Wolf, Andreas Lugmayr, Martin Danelljan, Luc Van Gool, Radu Timofte. IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2021. CVPR 2021 Deep Burst Super-Resolution. Goutam Bhat, Martin Danelljan, Luc Van Gool, Radu Timofte. IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2021. CVPR 2021 The Heterogeneity Hypothesis: Finding Layer-Wise Dissimilated Network Architecture. Yawei Li, Wen Li, Martin Danelljan, Kai Zhang, Shuhang Gu, Luc Van Gool, Radu Timofte. IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2021. ICRA 2021 Few-Shot Classification By Few-Iteration Meta-Learning. Ardhendu Tripathi, Martin Danelljan, Luc Van Gool, Radu Timofte. International Conference on Robotics and Automation (ICRA), 2021. NeurIPS 2020 DeepSVG: A Hierarchical Generative Network for Vector Graphics Animation. Alexandre Carlier, Martin Danelljan, Alexandre Alahi, Radu Timofte. Conference on Neural Information Processing Systems (NeurIPS), 2020. NeurIPS 2020 GOCor: Bringing Globally Optimized Correspondence Volumes into Your Neural Network. Prune Truong, Martin Danelljan, Luc Van Gool, Radu Timofte. Conference on Neural Information Processing Systems (NeurIPS), 2020. ECCV 2020 Learning What to Learn for Video Object Segmentation. Cited by 100 Goutam Bhat, Felix Järemo Lawin, Martin Danelljan, Andreas Robinson, Michael Felsberg, Luc Van Gool, Oral, top 2.1% Radu Timofte. European Conference on Computer Vision (ECCV), 2020. ECCV 2020 SRFlow: Learning the Super-Resolution Space with Normalizing Flow. Cited by 210 Andreas Lugmayr, Martin Danelljan, Luc Van Gool, Radu Timofte. Spotlight European Conference on Computer Vision (ECCV), 2020. top 5.3% ECCV 2020 **Energy-Based Models for Deep Probabilistic Regression.** Fredrik K Gustafsson, Martin Danelljan, Goutam Bhat, Thomas B Schön. European Conference on Computer Vision (ECCV), 2020. Know Your Surroundings: Exploiting Scene Information for Object Tracking. ECCV 2020 Cited by 200 Goutam Bhat, Martin Danelljan, Luc Van Gool, Radu Timofte. European Conference on Computer Vision (ECCV), 2020. ECCV 2020 Video object segmentation with episodic graph memory networks. Cited by 190 Xinkai Lu, Wenguan Wang, Martin Danelljan, Tianfei Zhou, Jianbing Shen, Luc Van Gool. Spotlight European Conference on Computer Vision (ECCV), 2020. top 5.3% BMVC 2020 How to Train Your Energy-Based Model for Regression. Fredrik K Gustafsson, Martin Danelljan, Radu Timofte, Thomas B Schön. British Machine Vision Conference (BMVC), 2020. CVPR 2020 GLU-Net: Global-Local Universal Network for Dense Flow and Correspondences. Cited by 100 Prune Truong, Martin Danelljan, Radu Timofte. Oral, top 5.7% IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2020.

CVPR 2020 Cited by <b>100</b>	Learning Fast and Robust Target Models for Video Object Segmentation.  Andreas Robinson, Felix Järemo Lawin, Martin Danelljan, Fahad Khan, Michael Felsberg.
Oral, top 5.7%	IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2020.
CVPR 2020 Cited by <b>370</b>	Probabilistic Regression for Visual Tracking.  Martin Danelljan, Luc Van Gool, Radu Timofte.  IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2020.
CVPR 2020	Learning Human-Object Interaction Detection using Interaction Points.
Cited by 160	
ICCV 2019 Cited by 770 Oral, top 4.3%	Learning Discriminative Model Prediction for Tracking.  Goutam Bhat, Martin Danelljan, Luc Van Gool, Radu Timofte.  IEEE International Conference on Computer Vision (ICCV), 2019.
ICCV 2019 Cited by 250	Learning the model update for siamese trackers.  Lichao Zhang, Abel Gonzalez-Garcia, Joost van de Weijer, Martin Danelljan, Fahad Shahbaz Khan.  IEEE International Conference on Computer Vision (ICCV), 2019.
BMVC 2019 Oral, top 4.7%	Tracking the Known and the Unknown by Leveraging Semantic Information.  Ardhendu Shekhar Tripathi, Martin Danelljan, Luc Van Gool, Radu Timofte.
Oral, top 11170	British Machine Vision Conference (BMVC), 2019. Best student paper award.
CVPR 2019	ATOM: Accurate Tracking by Overlap Maximization.
Cited by 930 Oral, top 5.6%	Martin Danelljan, Goutam Bhat, Fahad Khan, Michael Felsberg. IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2019.
CVPR 2019	A Generative Appearance Model for End-to-end Video Object Segmentation.
Cited by 160	Joakim Johnander, <b>Martin Danelljan</b> , Emil Brissman, Fahad Khan, Michael Felsberg.
Oral, top 5.6%	IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2019.
ECCV 2018 Cited by <b>450</b>	Unveiling the Power of Deep Tracking.  Goutam Bhat, Joakim Johnander, Martin Danelljan, Fahad Khan, Michael Felsberg.
Cited by 400	European Conference on Computer Vision (ECCV), 2018.
CVPR 2018	,
Oral, top 2.1%	Felix Järemo Lawin, <b>Martin Danelljan</b> , Fahad Khan, Per-Erik Forssén, Michael Felsberg. IEEE Conference on Computer Vision and Pattern Recognition ( <b>CVPR</b> ), 2018.
PRL 2018	Deep motion and appearance cues for visual tracking.
	Martin Danelljan, Goutam Bhat, Susanna Gladh, Fahad Shahbaz Khan, Michael Felsberg. Pattern Recognition Letters, 2018. Special issue invited paper.
TIP 2018 Cited by <b>100</b>	Synthetic data generation for end-to-end thermal infrared tracking.  Lichao Zhang, Abel Gonzalez-Garcia, Joost van de Weijer, Martin Danelljan, Fahad Shahbaz Khan.
,	IEEE Transactions on Image Processing, 2018.
CVPR 2017 Cited by <b>2390</b>	ECO: Efficient Convolution Operators for Tracking.  Martin Danelljan, Goutam Bhat, Fahad Khan, Michael Felsberg.
Cited by 2550	IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2017.
PAMI 2017	·
Cited by 1180	Martin Danelljan, Gustav Häger, Fahad Khan, Michael Felsberg. IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), 2017.
CAIP 2017	Deep projective 3D semantic segmentation.
Cited by 280 Oral	Felix Järemo Lawin, <b>Martin Danelljan</b> , Patrik Tosteberg, Goutam Bhat, Fahad Khan, Michael Felsberg. International Conference on Computer Analysis of Images and Patterns ( <b>CAIP</b> ), 2017.
ECCV 2016 Cited by <b>1880</b>	Beyond Correlation Filters: Learning Continuous Convolution Operators for Visual Tracking.
Oral, top 1.8%	Martin Danelljan, Andreas Robinson, Fahad Khan, Michael Felsberg. European Conference on Computer Vision (ECCV), 2016.
ICPR 2016	Deep Motion Features for Visual Tracking.
Cited by 90 Oral	Susanna Gladh, Martin Danelljan, Fahad Khan, Michael Felsberg.
ICPR 2016	International Conference on Pattern Recognition (ICPR), 2016. Best paper award.  Aligning the Dissimilar: A Probabilistic Method for Feature-Based Point Set Registration.
Oral	

CVPR 2016	A Probabilistic Framework for Color-Based Point Set Registration.
	Martin Danelljan, Giulia Meneghetti, Fahad Khan, Michael Felsberg. IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2016.
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CVPR 2016	Adaptive Decontamination of the Training Set: A Unified Formulation for Discriminative
Cited by 440	Visual Tracking.
	Martin Danelljan, Gustav Häger, Fahad Khan, Michael Felsberg.
	IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2016.
ICCV 2015	Learning Spatially Regularized Correlation Filters for Visual Tracking.
Cited by <b>2170</b>	Martin Danelljan, Gustav Häger, Fahad Khan, Michael Felsberg.
	IEEE International Conference on Computer Vision (ICCV), 2015.
ICCVW 2015	Convolutional Features for Correlation Filter Based Visual Tracking.
Cited by <b>1100</b>	Martin Danelljan, Gustav Häger, Fahad Khan, Michael Felsberg.
	ICCV workshop on the Visual Object Tracking (VOT) Challenge, 2015.
BMVC 2014	Accurate Scale Estimation for Robust Visual Tracking.
Cited by 2390	Martin Danelljan, Gustav Häger, Fahad Khan, Michael Felsberg.
	British Machine Vision Conference (BMVC), 2014.
CVPR 2014	Adaptive Color Attributes for Real-Time Visual Tracking.
Cited by <b>1800</b>	Martin Danelljan, Fahad Shahbaz Khan, Michael Felsberg, Joost van de Weijer.
Oral, top 5.8%	IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2014.