Martin Danelljan



Google Scholar **►**Citations: **17100**. H-index: **35**

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Litations: 1/100, H-index: 35

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Education and Degrees

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

- PhD studies with Prof. Michael Felsberg and Dr. Fahad Shahbaz Khan as my advisors.
- On the 11th of June 2018 I defended my thesis 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.
- As a part of my PhD studies, I have taken 90 ECTS credits of graduate courses within the areas of computer vision, machine learning, statistics, mathematics, 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.
- The first three years includes in mathematics, physics, programming, electronics and systems engineering.
- In the final two years, I focused on signal and image processing, with in-depth courses in signal theory, computer vision, sensor fusion, machine learning, multi-core/GPU programming and mathematics.
- My master's thesis titled Visual Tracking was awarded best thesis by the Swedish computer society and presented at the premier conference on Computer Vision and Pattern Recognition (CVPR) 2014.

Academic Positions

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

present Managing, coordinating, and supervising research conducted by the team.

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.

2012 **Summer Intern**, *Computer Vision Laboratory, Linköping University*. Implementation and further development of a state-of-the-art video stabilization method.

2012 **Teaching Assistant**, *Department of Electrical Engineering, Linköping University*. Teaching assistant in a control theory course.

2009 **Teaching Assistant**, *Department of Mathematics, Linköping University*. Teaching assistant in a calculus course.

Entrepreneurial Experience

Oct. 2017 - Cofounder and owner, Singulareye.

Dec. 2018 The company provides consultancy and commercializes 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 applications. Customer: *NIRA Dynamics* (Linköping).
- Nov. 2017 Dec. 2018: Computer vision solution for a smartphone AR application. We deployed the visual tracking algorithms I developed during my PhD studies. Customer: Just Football.

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

- 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

- ☆ 170 Continuous-ConvOp 🖸 github.com/martin-danelljan/Continuous-ConvOp

Supervision

PhD students (active co-supervisor)

- 2020 present **Prune Truong**, ETH Zürich. ♠ prunetruong.com
- 2019 present Goutam Bhat, ETH Zürich. ⋒ goutamgmb.github.io
- 2019 present Andreas Lugmayr, ETH Zürich. in linkedin.com/in/andreaslugmayr

- 2019 present **Ardhendu Shekhar Tripathi**, ETH Zürich.
- 2019 present Fredrik K. Gustafsson, Uppsala University. A fregu856.com
- 2018 present **Joakim Johnander**, Linköping University.

Master's Thesis students

I have supervised 10 MSc students at ETH Zürich and 14 at Linköping University. These include:

- 2020 Valentin Wolf, ETH Zürich.
 - The thesis work DeFlow was published at CVPR 2021 as oral presentation.
- 2020 Alexandre Carlier, ETH Zürich, ★ github.com/alexandre01.

 The thesis work DeepSVG was accepted at NeurIPS 2020 ♀ github.com/alexandre01/deepsvg.
- 2019 **Prune Truong**, *ETH Zürich*, PhD student at ETH. ★ prunetruong.com. The thesis work *GLU-Net* was published at CVPR 2020 as oral presentation.
- 2019 Sohyeong Kim, ETH Zürich, PhD student at EPFL.
- 2018 **Goutam Bhat**, *Linköping University*, PhD student at ETH.

 Parts of the work was published at ECCV 2018 and CVPR 2019 as oral presentation.
- 2016 Joakim Johnander, Linköping University, PhD student at LiU.
- 2016 **Susanna Ahlberg (Gladh)**, *Linköping University*, Cybercom. The thesis work was published at ICPR 2016 and received best paper award.
- 2014 **Gustav Häger**, *Linköping University*, PhD student at LiU. Parts of the thesis work was published at BMVC 2014 and TPAMI.

Teaching

- 2020 **Deep Learning for Image Manipulation**, *ETH Zurich*, lecturer. Lecturer and design of the course.
- 2017 2018 Introductory Project Course in Engineering (TFYY51), *Linköping University*, lecturer. Lecturer, along with design and organization of the projects.
- 2014 2018 **Computer Vision (TSBB15)**, *Linköping University*, labs and projects. Assistant at labs and supervisor of course projects.
- 2013 2018 **Signals and Systems (TSDT18/84)**, *Linköping University*, lessons, labs and exams. Also performing a short lecture with example exercises as introduction to each lesson.
 - 2018 Image Analysis (TSBB08), Linköping University, labs.
- 2014 2018 Linear Systems (TSKS09/06), *Linköping University*, lessons, labs and exams. Teaching assistant at lessons and labs along with correcting exams.
 - 2012 **Control Theory (TSRT12/22)**, *Linköping University*, lessons, labs and exams. Teaching assistant at lessons and labs along with correcting exams.
 - 2009 Calculus in one Variable (TAIU10), Linköping University, lessons.

Invited Speaker and Talks

- 2021 Keynote speaker at Swedish Symposium on Deep Learning.
- 2019 FIRE: From Image Restoration to Enhancement and Beyond, Tutorial at ICCV 2019, Seoul, South Korea.
- 2019 The 45th Pattern Recognition and Computer Vision Colloquium, Czech Technical University, Prague, Czech Republic.
- 2018 **Discriminative Correlation Filters for Visual Tracking**, *Tutorial at GCPR 2018, Stuttgart, Germany.*
- 2018 Invited talk at Tobii, Stockholm, Sweden.
- 2016 Visual Object Tracking Challenge, Workshop at ECCV 2016, Amsterdam, Netherlands.
- 2016 Invited talk at Kapsch, Jönköping, Sweden.

- 2015 Visual Object Tracking Challenge, Workshop at ICCV 2015, Santiago, Chile.
- 2014 Visual Object Tracking Challenge, Workshop at ECCV 2014, Zürich, Switzerland.

Languages

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

Selected Publications

- CVPR 2022 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, $\textbf{Martin Danelljan}, \ \text{Xia Li, Yu-Wing Tai, Chi-Keung Tang, Fisher Yu}.$

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 Prototypical Cross-Attention Networks for Multiple Object Tracking and Segmentation .
 - Spotlight, top Lei Ke, Xia Li, Martin Danelljan, Yu-Wing Tai, Chi-Keung Tang, Fisher Yu.
 - 3.0% Conference on Neural Information Processing Systems (NeurIPS), 2021.
 - ICCV 2021 Warp Consistency for Unsupervised Learning of Dense Correspondences.
- Oral, top 3.0% Prune Truong, Martin Danelljan, Fisher Yu, Luc Van Gool.

IEEE International Conference on Computer Vision (ICCV), 2021.

- ICCV 2021 Deep Reparametrization of Multi-Frame Super-Resolution and Denoising.
- Oral, top 3.0% 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 Learning Target Candidate Association to Keep Track of What Not to Track.

Christoph Mayer, Martin Danelljan, Danda Pani Paudel, Luc Van Gool.

IEEE International Conference on Computer Vision (ICCV), 2021.

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. IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2021.
CVPR 2021	DeFlow: Learning Complex Image Degradations from Unpaired Data with Conditional
Oral, top 4.0%	Flows.
	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.
101012021	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.
Oral, top 2.1%	Goutam Bhat, Felix Järemo Lawin, Martin Danelljan , Andreas Robinson, Michael Felsberg, Luc Van Gool, Radu Timofte. European Conference on Computer Vision (ECCV), 2020.
ECCV 2020	SRFlow: Learning the Super-Resolution Space with Normalizing Flow.
Cited by 90 Spotlight top 5.3%	Andreas Lugmayr, Martin Danelljan , Luc Van Gool, Radu Timofte. European Conference on Computer Vision (ECCV), 2020.
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.
ECCV 2020	Know Your Surroundings: Exploiting Scene Information for Object Tracking.
	Goutam Bhat, Martin Danelljan , Luc Van Gool, Radu Timofte. European Conference on Computer Vision (ECCV), 2020.
ECCV 2020 Cited by 80 Spotlight top 5.3%	Video object segmentation with episodic graph memory networks. Xinkai Lu, Wenguan Wang, Martin Danelljan, Tianfei Zhou, Jianbing Shen, Luc Van Gool. European Conference on Computer Vision (ECCV), 2020.
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.
Oral, top 5.7%	Prune Truong, Martin Danelljan , Radu Timofte. IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2020.
CVPR 2020	Learning Fast and Robust Target Models for Video Object Segmentation.
Cited by 50	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	Probabilistic Regression for Visual Tracking.
Cited by 150	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 70	Tiancai Wang, Tong Yang, Martin Danelljan , Fahad Khan, Xiangyu Zhang, Jian Sun. IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2020.
ICCV 2019	Learning Discriminative Model Prediction for Tracking.
Cited by 400	Goutam Bhat, Martin Danelljan, Luc Van Gool, Radu Timofte.
Oral, top 4.3%	IEEE International Conference on Computer Vision (ICCV), 2019.
ICCV 2019	Learning the model update for siamese trackers.
Cited by 130	Lichao Zhang, Abel Gonzalez-Garcia, Joost van de Weijer, Martin Danelljan , Fahad Shahbaz Khan. IEEE International Conference on Computer Vision (ICCV), 2019.
BMVC 2019	Tracking the Known and the Unknown by Leveraging Semantic Information.
Oral, top 4.7%	Ardhendu Shekhar Tripathi, Martin Danelljan , Luc Van Gool, Radu Timofte. British Machine Vision Conference (BMVC), 2019. Best student paper award .
CVPR 2019	ATOM: Accurate Tracking by Overlap Maximization.
Cited by 520	Martin Danelljan, Goutam Bhat, Fahad Khan, Michael Felsberg.
Oral, top 5.6%	IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2019.
CVPR 2019 Cited by 100	A Generative Appearance Model for End-to-end Video Object Segmentation. Joakim Johnander, Martin Danelljan, Emil Brissman, Fahad Khan, Michael Felsberg.
Oral, top 5.6%	IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2019.
ECCV 2018	Unveiling the Power of Deep Tracking.
Cited by 330	Goutam Bhat, Joakim Johnander, Martin Danelljan , Fahad Khan, Michael Felsberg. European Conference on Computer Vision (ECCV), 2018.
CVPR 2018	Density Adaptive Point Set Registration.
Oral, top 2.1%	Felix Järemo Lawin, Martin Danelljan , Fahad Khan, Per-Erik Forssén, Michael Felsberg. IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 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	Synthetic data generation for end-to-end thermal infrared tracking.
Cited by 60	Lichao Zhang, Abel Gonzalez-Garcia, Joost van de Weijer, Martin Danelljan , Fahad Shahbaz Khan. IEEE Transactions on Image Processing, 2018.
CVPR 2017	ECO: Efficient Convolution Operators for Tracking.
Cited by 1820	Martin Danelljan, Goutam Bhat, Fahad Khan, Michael Felsberg. IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2017.
PAMI 2017	Discriminative Scale Space Tracking.
Cited by 980	Martin Danelljan, Gustav Häger, Fahad Khan, Michael Felsberg. IEEE Transactions on Pattern Analysis and Machine Intelligence, 2017.
CAIP 2017	Deep projective 3D semantic segmentation.
Cited by 180 Oral	Felix Järemo Lawin, Martin Danelljan , Patrik Tosteberg, Goutam Bhat, Fahad Khan, Michael Felsberg. International Conference on Computer Analysis of Images and Patterns (CAIP), 2017.
ECCV 2016	Beyond Correlation Filters: Learning Continuous Convolution Operators for Visual Tracking.
Cited by 1560 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 80	Susanna Gladh, Martin Danelljan, Fahad Khan, Michael Felsberg.
Oral	International Conference on Pattern Recognition (ICPR), 2016. Best paper award.
ICPR 2016	Aligning the Dissimilar: A Probabilistic Method for Feature-Based Point Set Registration.
Oral	Martin Danelljan, Giulia Meneghetti, Fahad Shahbaz Khan, Michael Felsberg. International Conference on Pattern Recognition (ICPR), 2016.
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.
CVPR 2016	Adaptive Decontamination of the Training Set: A Unified Formulation for Discriminative
Cited by 390	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 1830	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 930	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 2190	Martin Danelljan, Gustav Häger, Fahad Khan, Michael Felsberg.
Cited by 2190	Martin Danelljan, Gustav Häger, Fahad Khan, Michael Felsberg. British Machine Vision Conference (BMVC), 2014.
Cited by 2190 CVPR 2014	•
•	British Machine Vision Conference (BMVC), 2014.