# Martin Danelljan

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Citations: **10600**, H-index: **25**

Followers: **500**, ☆ **2000**

## 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 – present **Group Leader and Lecturer**, *Computer Vision Laboratory, ETH Zürich*.
Managing, coordinating, and supervising research conducted by the team.

Jan. 2019 – Nov. 2020 **Postdoctoral Researcher**, *Computer Vision Laboratory, ETH Zürich*.
Under Prof. Luc Van Gool. The position includes supervision of several PhD and Master students.

Mar. 2014 – Dec. 2018 **PhD Student in Computer Vision**, *Computer Vision Laboratory, Linköping University*.
The position included research, studying related graduate courses ($\sim 20\%$) and teaching ($\sim 20\%$).

Aug. 2013 – Mar. 2014 **Research Engineer and TA**, *Computer Vision Laboratory, Linköping University*.
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 – present **Cofounder and owner**, *Singulareye*.
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

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.

## Organized Workshops and Tutorials

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

☆ 1300 **PyTracking** github.com/visionml/pytracking
☆ 500 **ECO** github.com/martin-danelljan/ECO
☆ 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. linkedin.com/in/andreaslugmayr
2019 – present **Ardhendu Shekhar Tripathi**, ETH Zürich.
2019 – present **Fredrik K. Gustafsson**, Uppsala University. fregu856.com
2018 – present **Joakim Johnander**, Linköping University.

### Master's Thesis students

I have supervised 8 MSc students at ETH Zürich and 14 at Linköping University. These include:

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

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

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**.
**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 **Video object segmentation with episodic graph memory networks**.
**Spotlight** top **5.3%** 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**.
**Oral**, top **5.7%** Andreas Robinson, Felix Järemo Lawin, **Martin Danelljan**, Fahad Khan, Michael Felsberg.
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2020.

CVPR 2020 **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**.
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 **110** 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 **30** 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 **180** **Martin Danelljan**, Goutam Bhat, Fahad Khan, Michael Felsberg.
**Oral**, top **5.6%** 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 **30** 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 **170** 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.

CVPR 2017 **ECO: Efficient Convolution Operators for Tracking**.
Cited by **1080** **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 **630** **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 **80** Felix Järemo Lawin, **Martin Danelljan**, Patrik Tosteberg, Goutam Bhat, Fahad Khan, Michael Felsberg.
**Oral** 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 **1060** **Martin Danelljan**, Andreas Robinson, Fahad Khan, Michael Felsberg.
**Oral**, top **1.8%** European Conference on Computer Vision (**ECCV**), 2016.

ICPR 2016 **Deep Motion Features for Visual Tracking**.
Cited by **50** 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 Visual Tracking**.
Cited by **290** **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 **1270** **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 **680** **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 **1660** **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 **1290** **Martin Danelljan**, Fahad Shahbaz Khan, Michael Felsberg, Joost van de Weijer.
**Oral**, top **5.8%** IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**).