Evan Shelhamer

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RESEARCH
INTERESTS

Computer vision and machine learning,
in particular the reconciliation of visual structure with end-to-end learning,
and optimization during inference for more adaptive modeling and computation.

I am convinced that reproducible research done right is extensible research,
so I develop open tools for do-it-yourself science.

EDUCATION

University of California, Berkeley · *Fall 2012 - Spring 2019*
PhD Computer Science
Advisor: Trevor Darrell
Thesis: Local and Adaptive Image-to-Image Learning and Inference

University of Massachusetts Amherst (Commonwealth College) · *Fall 2008 - Spring 2012*
B.S. Computer Science (AI concentration) & B.S. Psychology
with Department and University Honors
Advisor: Erik Learned-Miller

EMPLOYMENT

DeepMind, London
Research Scientist   *January 2021 - Present*
Deep learning and computer vision research and development on robust visual recognition, self-supervised learning, and attention architectures.

Adobe, Cambridge MA
Research Scientist   *September 2019 - December 2020*
Deep learning and computer vision research and development on adaptation to shifts (like weather), anytime inference, and image processing for recognition.

MIT, Cambridge MA
Visiting Research Scientist   *January 2020 - December 2020*
Guest lecturing, group discussions, and 1:1 student meetings in the Freeman and Isola groups.

University of California, Berkeley
Graduate Student Researcher   *September 2012 - May 2019*
Thesis work on the end-to-end learning of image-to-image tasks, in particular the design and analysis of fully convolutional networks: multi-layer, multi-scale models for local recognition. Lead developer of Caffe, the open-source deep learning framework (caffe.berkeleyvision.org).

Facebook AI Research, Seattle
PhD Intern Researcher   *July - October 2018*
Visual recognition research supervised by Ross Girshick.

DeepMind, London
PhD Intern Researcher   *June - September 2017*
Deep reinforcement learning research supervised by Max Jaderberg.

OpenAI, San Francisco
PhD Intern Researcher   *September 2016 - May 2017*
Reinforcement learning research and engineering supervised by John Schulman. (20% time.)

AWARDS &
RECOGNITION
Mark Everingham Prize for service to the computer vision community through Caffe. (2017)
CVPR Best Paper Honorable Mention for fully convolutional networks. (2015)
ACM MM Open Source Award for the open source contribution of Caffe. (2014)
National Science Foundation Graduate Research Fellowship (2012-2015)
AI2000 Scholar Award for top 100 vision researchers as ranked by AMiner. (2020, 2022)
FADEx AI Fellow one of ten US representatives for US-France summit. (2018)

EECS Chair Excellence Award department award. (2012)
UMass Amherst CS Award department award for top undergradate student. (2012)
ACM/UPE Award national award for achievement and outreach; one of four. (2011)
C.D. Youngren Research Award UMass Amherst research award & stipend; sole winner. (2010)
Commonwealth Honors UMass Amherst honors degree program. (2008-2012)

Reviewing Awards CVPR (2019, 2020, 2022), ICML (2020, 2021, 2022), ECCV (2020), NeurIPS (2020), ICLR (2022).

SERVICE
Area Chairing: CVPR (2021, 2023), ICCV (2021).
Reviewing: CVPR (2014-2020), ICCV (2015-2019), ECCV (2016-), NeurIPS (2014-), ICML (2015-), ICLR (2015-), JMLR (2020, 2021), PAMI (2016, 2017, 2021, 2022) and TMLR (2022-).
Tutorials: DIY Deep Learning at CVPR'15 and ECCV'14.
Graduate Admissions: reviewed PhD applications in AI at UC Berkeley. *2016-2017*
CSGSA: officer of the Berkeley Computer Science Graduate Association. *2013-2015*
UMass Amherst ACM: president. *2011-2012*
UMAss Amherst Sciences Deans' Committee: open houses and outreach. *2010-2012*

PUBLICATIONS
Object Discovery and Representation Networks *ECCV 2022*.
O. Henaff, S. Koppula, E. Shelhamer, D. Zoran, A. Jaegle, A. Zisserman, J. Carreira, R. Arand-jelović.

Evaluating the Adversarial Robustness of Test-Time Adaptive Defenses *ICML 2022*.
F. Croce*, T. Brunner*, E. Shelhamer*, S. Gowal*, T. Cemgil, M. Hein.
(*equal contribution)

Anytime Dense Prediction with Confidence Adaptivity *ICLR 2022*.
Z. Liu, Z. Xu, H.J. Wang, T. Darrell, E. Shelhamer.

Perceiver IO: A General Architecture for Structured Inputs & Outputs *ICLR 2022*.
A. Jaegle, S. Borgeaud, J.B. Alayrac, C. Doersch, C. Ionescu, D. Ding, S. Koppula, D. Zoran, A. Brock, E. Shelhamer, O. Hénaff, M. Botvinick, A. Zisserman, O. Vinyals, J. Carreira.

Exploring Simple and Transferable Recognition-Aware Image Processing. *PAMI 2022*.
Z. Liu, H. Wang, T. Zhou, Z. Shen, B. Kang, E. Shelhamer, T. Darrell.

Where Should I Spend My FLOPS? Efficiency Evaluations of Visual Pre-training Methods *NeurIPSW 2022*.
S. Koppula, Y. Li, E. Shelhamer, A. Jaegle, N. Parthasarathy, R. Arandjelovic, J. Carreira, O. Henaff

Fighting Gradients with Gradients: Dynamic Defenses against Adaptive Attacks *ICLRW 2021*.
D. Wang, A. Ju, E. Shelhamer, D. Wagner, T. Darrell.

Tent: Fully Test-time Adaptation by Entropy Minimization *ICLR 2021.*
D. Wang*, E. Shelhamer*, S. Liu, B. Olshausen, T. Darrell. *Spotlight.*
(*equal contribution)

Blurring the Line between Structure and Learning to Optimize and Adapt Receptive Fields
ICLRW 2019.
E. Shelhamer, D. Wang, T. Darrell.

Infinite Mixture Prototypes *ICML 2019*
K. Allen, E. Shelhamer*, H. Shin*, J. Tenenbaum.

Conditional Networks for Few-Shot Semantic Segmentation *ICLRW 2018*
K. Rakelly*, E. Shelhamer*, T. Darrell, A. A. Efros, S. Levine.
(*equal contribution)

Zero-Shot Visual Imitation *ICLR 2018*
D. Pathak*, P. Mahmoudieh*, M. Luo*, P. Agrawal*, D. Chen, F. Shentu, E. Shelhamer, J. Malik,
A. A. Efros, T. Darrell. *Oral.*
(*equal contribution)

Deep Layer Aggregation *CVPR 2018*
F. Yu, D. Wang, E. Shelhamer, T. Darrell. *Oral.*

Loss Is Its Own Reward: Self-Supervision for Reinforcement Learning *ICLRW 2017*
E. Shelhamer, P. Mahmoudieh, M. Argus, T. Darrell.

Clockwork Convnets for Video Semantic Segmentation *ECCVW 2016*
E. Shelhamer*, K. Rakelly*, J. Hoffman*, T. Darrell.
(*equal contribution)

Fully Convolutional Multi-class Multiple Instance Learning *ICLRW 2015*
D. Pathak, E. Shelhamer, J. Long, T. Darrell.

Fully Convolutional Networks for Semantic Segmentation *PAMI 2016*
E. Shelhamer*, J. Long*, T. Darrell.
(*equal contribution)

Fully Convolutional Networks for Semantic Segmentation *CVPR 2015*
J. Long*, E. Shelhamer*, T. Darrell. *Honorable Mention for Best Paper. Oral.*
(*equal contribution)

Caffe: Convolutional Architecture for Fast Feature Embedding *ACM MM 2014*
Y. Jia, E. Shelhamer, J. Donahue, S. Karayev, J. Long, R. Girshick, S. Guadarrama, T. Darrell.
Open source award.

cuDNN: Efficient Primitives for Deep Learning *NIPS DL Workshop 2014*
S. Chetlur, C. Woolley, P. Vandermersch, J. Cohen, J. Tran, B. Catanzaro, E. Shelhamer.
Oral.

Communal cuts: sharing cuts across images *NIPS DISCOPT Workshop 2014*
E. Shelhamer, S. Jegelka, T. Darrell.

TALKS   **Robust Visual Recognition by Test-Time Adaptation** *2022*
Invited talk at CMU and Tidal (Google X); keynote talk at DataFest Yerevan.

Fully Test-Time Adaptation and Defense by Entropy Minimization *2021*
Invited talk at U. Tubingen for Bethge and Brendel groups.

Test-time Optimization for Adaptive and Interactive Inference *2020*
Invited talk at MIT for Isola group.

Blurring between Structure and Learning for Adaptive Local Recognition *2019 - 2020*
Invited talks at MIT, UBC, Adobe, DeepMind, BU, and NYU.

Few-Shot Segmentation through Guidance *2018*
Invited talk for FADEx AI (exchange hosted by INRIA Sophia Antipolis, Grenoble, and Paris).

Pixels In, Pixels Out: Learning and Inference for Image-to-Image Tasks *2018*
Invited talk at BarCamp Yerevan (industry conference in Armenia).

Clockwork Video Segmentation *2017*
Invited talk for the vision group at DeepMind, London.

End-to-End Recognition for Autonomous Vehicles *2016*
Invited talk at Intelligent Vehicles in Gothenburg, Sweden.

Fully Convolutional Networks for Semantic Segmentation *2015–2016*
Invited talks at MIT, Stanford, INRIA Paris, and UMass Amherst.

Caffe: Community Architecture for Fast Feature Embedding *July 2015*
Workshop talk at ICML MLOSS.

DIY Deep Learning for Vision: a Hands-On Tutorial *2014–2016*
CVPR 2015 conference tutorial. Attended by 400+.
ECCV 2014 conference tutorial. Attended by 100+.
GTC 2015–2016 industry conference tutorials. Attended by 200+.

The Caffe Latest Roast *2014–2016*
Invited industry talks at Sony, Yahoo! Japan, Samsung, Amazon & A9.

Teaching

Graduate Student Instructor (TA)
University of California, Berkeley   *Fall 2014*
DIY Deep Learning: made tutorials, led seminars, and answered 1000+ questions online.

Graduate Student Instructor (TA)
University of California, Berkeley   *Fall 2013*
CS 188 Artificial Intelligence: taught by Dan Klein and Pieter Abbeel and offered to four hundred
Berkeley undergraduates as well as online to thousands. Led discussion section 3 hours/week,
held office hours, created exams and tutorials, and helped maintain the project auto-grader.

Guest Lecturer
Test-Time Adaptation for Visual Recognition at KAUST for Prof. El-Hosseiny, *2021*
Weaving Deep Networks at MIT for Prof. Isola, *2019*
Adaptive Local Recognition at UMass Amherst for Prof. Learned-Miller, *2019*
Image-to-Image Learning and Inference at Yerevan State U. for Instructor Khachatryan, *2018*
Image-to-Image Learning and Inference at UC Berkeley for Profs. Darrell and Prof. Efros, *2015*
DIY Deep Learning with Caffe at UC Berkeley for Prof. Canny, *2015*
DIY Deep Learning with Caffe at Stanford for Instructor Karpathy, *2015*
DIY Deep Learning with Caffe at UMass Lowell for Prof. Saenko, *2014*