A/Prof Krista A. Ehinger

School of Computing and Information Systems, The University of Melbourne
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Education

Massachusetts Institute of Technology — Cambridge, USA
Ph.D. in Cognitive Science — 2007-2013
Thesis: *Visual features for scene recognition and reorientation*
Advisor: Dr Ruth Rosenholtz

University of Edinburgh — Edinburgh, UK
B.Sc. (Hons) in Psychology — 2004-2007
Thesis: *Role of low- and high-spatial-frequency information in real-world scene contextual cueing*
Advisor: Dr James Brockmole

California Institute of Technology — Pasadena, USA
B.S. in Engineering & Applied Science — 1999-2003

Professional Appointments

The University of Melbourne — Melbourne, Australia
Associate Professor, School of Computing and Information Systems — 2025–

The University of Melbourne — Melbourne, Australia
Senior Lecturer in Digital Health, School of Computing and Information Systems — 2019–2025

York University — Toronto, Canada
VISTA Postdoctoral Fellow, Centre for Vision Research — 2016-2019
Supervisor: Dr James Elder

Digital Cognition Technologies — Waltham, USA
Independent contractor — 2016
- Medical data mining and analysis
- Evaluation of statistical models

Massachusetts Institute of Technology — Cambridge, USA
Instructor, Dept of Brain & Cognitive Sciences — 2014-2015

Harvard Medical School — Cambridge, USA
Postdoctoral Fellow — 2013-2016
Supervisor: Dr Jeremy Wolfe

Grants & Fellowships

ARC DP240101264 — 2024-2028, $586,979
Dr Adam Osth, Prof Robert Nosofsky, **Dr Krista Ehinger**
Using cognitive models to understand memorability of real world images

University of Melbourne Research Collaboration Seed Funding 2024, $20,000
Dr Krista Ehinger, Dr Davood Shojaei
Using Artificial Intelligence to detect and extract underground utilities from Ground Penetrating Radar (GPR) images

University of Melbourne Research Collaboration Seed Funding 2024, $40,000
Dr Krista Ehinger, Dr Kevin Kevin
Developing an in-house algorithm for 3D reconstruction of biofouled surfaces in an underwater environment

ONI NI220100072 2022-2025, $589,975
Prof James Bailey, Prof Michele Trenti, Prof Richard Sinnott, Prof Benjamin Rubinstein, **Dr Krista Ehinger**
Robust and autonomous machine learning on board a miniature satellite

ARC DP210100433 2021-2024, $388,735
A/Prof Guillermo Narsilio, A/Prof Mahdi Disfani, **Dr Krista Ehinger**, Prof J Carlos Santamarina
Heat transfer and fluid flow in geomaterials: Physics-inspired AI framework

MEL/BER Partnership Program 2021, $81,725
Prof Carsten Finke, Prof Amit Lampit, Dr Samantha Loi, Dr Tamsyn Van Rheenen, **Dr Krista Ehinger**, Prof Kerstin Ritter
Artificial Intelligence to advance Cognitive Training Adherence and Compliance at Home (AI-COACH)

University of Melbourne MSE Platform Interdisciplinary Grant 2020, $30,000
Dr Krista Ehinger, Prof Tuan Ngo
Reducing risk and improving safety on construction sites by computer vision and AI

Vision: Science to Applications (VISTA) Postdoctoral Fellowship 2017-2019, $140,000 (Canada)

National Science Foundation Graduate Research Fellowship 2009-2012, $315,000 (USA)

Leadership & Service

The University of Melbourne

AI Subject Cluster lead	2022-
AI Research Group co-lead	2021-
Human Research Ethics Committee member	2020-
Course Coordinator, Master of IT (AI stream)	2020-2022

Editorships & Conference Organization

Associate Editor, *Visual Cognition* (Taylor & Francis, UK)	2020-
Organizer, Mutual Benefits of Cognitive and Computer Vision workshop at CVPR	2018-2019
Organizer, A Crash Course in Human Vision tutorial at CVPR	2018

STEM Outreach

Mentor for Techgirls national competition (Melbourne, Australia)	2021
Volunteer tutor for Ladies Learning Code (Toronto, Canada)	2017

Mentor for Harvard Medical School's Project SUCCESS (Cambridge, USA) 2015
Scholar Award search committee, Philanthropic Educational Organization (Cambridge, USA) 2014-2016

Awards

Excellence in Research, School of CIS, The University of Melbourne 2023
Facebook Reality Labs award for best Human Vision poster, ICPV2019 (2nd place) 2019

Teaching

The University of Melbourne Melbourne, Australia

Machine Learning (COMP30027) 2024- (Sem 1)
Coodinator, co-instructor Basim Azam

Introduction to Machine Learning (COMP90049) 2023- (Sem 1)
Co-instructors Hasti Samadi, Ting Dang

Computer Vision (COMP90086) 2022- (Sem 2)
Coodinator, co-instructor Tom Drummond

Computer Vision (COMP90086) 2021 (sem 2)
Coodinator and subject designer

Machine Learning (COMP30027) 2020-2021 (Sem 1)
Coodinator, co-instructor Ling Luo

Algorithms and Data Structures (COMP20003) 2019-2020 (Sem 2)
Co-instructor Nir Lipovetzky

Massachusetts Institute of Technology Cambridge, USA

Computational Perception (9.77) 2014-2015 (Spring)
Subject designer, Co-instructor Edward Adelson

Short courses

Introduction to Computer Vision (5-hour short course) 2014
Subject designer, written for Frank S. Levy, Dept. of Urban Studies & Planning, MIT

PhD Supervision

Muhammad Suhail Najeeb (primary supervisor) 2024-
co-supervisor: Naveed Akhtar

Patrycja Solak 2024-
co-supervisors: Christine Nguyen, David Finkelstein, Sam John, Bao Nguyen

Johnson Zhou 2024-
co-supervisors: Joseph West, Sam John, David Grayden

Zuo Huang 2023-
co-supervisor: Richard Sinnott

Zihan Yang 2023-
co-supervisors: Richard Sinnott, James Bailey

Tingxuan Wang (primary supervisor) 2023-
co-supervisors: Wenbin Fei, Tom Drummond

Chao Lei 2022-
co-supervisors: Nir Lipovetzky, Sigfredo Fuentes

Markus Hiller 2022-
co-supervisor: Tom Drummond

Zhenkai Zhang 2022-
co-supervisor: Tom Drummond

Yuguang Liu 2022-
co-supervisor: Kourosh Khoshelham

Jiayang Ao (primary supervisor) 2021-
co-supervisor: Qiuhong Ke

Rinu Ann Sebastian (primary supervisor) 2021-
co-supervisors: Tim Miller, Tuan Ngo

Stephen R. Spratley (primary supervisor) 2019-2024
co-supervisors: Tim Miller, Ben Rubinstein

Ruihan Zhang (primary supervisor) 2019-2024
co-supervisors: Tim Miller, Ben Rubinstein

Shima Rashidi 2019-2021
co-supervisors: Andrew Turpin, Lars Kulik, Trichur Vidyasagar

Publications

Wang, T., Fei, W., **Ehinger, K. A.**, Drummond, T. W., & Narsilio, G. A. (2025). Improved Level Set Method for Particle Reconstruction from X-Ray Computed Tomography Images. Powder Technology.

Lei, C., Lipovetzky, N., & **Ehinger, K. A.** (2025). State-Based Disassembly Planning. AAAI Conference on Artificial Intelligence.

Zhang, Z., **Ehinger, K. A.**, & Drummond, T. (2025). TCAM-Diff: Triplane-Aware Cross-Attention Medical Diffusion Model. AAAI Conference on Artificial Intelligence.

Hiller, M., **Ehinger, K. A.**, & Drummond, T. (2024). Perceiving Longer Sequences With Bi-Directional Cross-Attention Transformers. Neural Information Processing Systems (NeurIPS).

Joukhadar, Z., Morgan, J., Bayliss, C., Ortiz del Castillo, M., McRobbie, J., Mearns, R., **Ehinger, K. A.**, Rubinstein, B. I. P., Sinnott, R. O., Trenti, M., & Bailey, J. (2024). Designing an Adaptive AI System for Operation on Board the SpIRIT Nano-satellite. Australasian Joint Conference on Artificial Intelligence (AJCAI).

Zuo, H., Sinnott, R. O., & **Ehinger, K. A.** (2024). End-to-end Truck Speed Detection using Deep Multi-Task Learning. Australasian Joint Conference on Artificial Intelligence (AJCAI).

Ao, J., Ke, Q., & **Ehinger, K. A.** (2024). Sequential Amodal Segmentation via Cumulative Occlusion Learning. 35th British Machine Vision Conference (BMVC).

Jiang, Y., **Ehinger, K. A.**, & Lau, J. H. (2024). KALE: An Artwork Image Captioning System Augmented with Heterogeneous Graph. Proceedings of the 33rd International Joint Conference on Artificial Intelligence (IJCAI).

Ortiz del Castillo, M., Morgan, J., McRobbie, J., Therakam, C., Joukhadar, Z., Mearns, R., Barraclough, S.,Sinnott, R., Woods, A., Bayliss, C., Ehinger, K., Rubinstein, B., Bailey, J., Chapman, A., & Trenti, M. (2024). Mitigating Challenges of the Space Environment for Onboard Artificial Intelligence: Design Overview of the Imaging Payload on SpIRIT. Computer Vision and Pattern Recognition (CVPR) Workshop AI4Space 2024: 3rd Workshop on AI for Space.

Patel, K. Y., Wilcox, L. M., Maloney, L. T., **Ehinger, K. A.**, Patel, J. Y., Wiedenmann, E., & Murray, R. F. (2024). Lightness constancy in reality, in virtual reality, and on flat-panel displays. *Behavior Research Methods*, 56, 6389-6407.

Lei, C, Lipovetzky, N, & **Ehinger, K. A.** (2024). Generalized Planning for the Abstraction and Reasoning Corpus. *AAAI Conference on Artificial Intelligence*

Ao, J., Ke, Q., & **Ehinger, K. A.** (2024). Amodal intra-class instance segmentation: Synthetic datasets and benchmark. Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (WACV), pp. 281-290.

Zhang, Z., **Ehinger, K. A.**, & Drummond, T. (2023). Improving denoising diffusion models via simultaneous estimation of image and noise. Asian Conference on Machine Learning (ACML).

Huang, Z., Sinnott, R. O., & **Ehinger, K. A.** (2023). Truck speed detection through video streams. Proceedings 2023 19th International Conference on e-Science.

Rashidi, S., Xu, W., Lin, D., Turpin, A., Kulik, L., & **Ehinger, K. A.** (2023). An active foveated gaze prediction algorithm based on a Bayesian ideal observer. *Pattern Recognition*, 143, 109694.

Lei, C., Lipovetzky, N., & **Ehinger, K. A.** (2023). Novelty and lifted helpful actions in generalized planning. 16th International Symposium on Combinatorial Search (SoCS).

Spratley, S., **Ehinger, K. A.**, & Miller, T. (2023). Unicode Analogies: An anti-objectivist visual reasoning challenge. Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 19082-19091.

Ao, J., Ke, Q., & **Ehinger, K. A.** (2022). Image Amodal Completion: A Survey. Computer Vision and Image Understanding, 229, 103661.

Aizenman, A. M., **Ehinger, K. A.**, Wick, F. A., Micheletto, R., Park, J., Jurgensen, L., & Wolfe, J. M. (2022). Hiding the Rabbit: Using a genetic algorithm to investigate shape guidance in visual search. *Journal of Vision*, 22(1), 7-7.

Anderson, M., Graf, E. W., Elder, J. H., **Ehinger, K. A.**, & Adams, W. J. (2021). Category systems for real-world scenes. *Journal of Vision*, 21(2), 8-8.

Zhang, R., Madumal, P., Miller, T., **Ehinger, K. A.**, & Rubinstein, B. I. P. (2021). Invertible concept-based explanations for CNN models with non-negative concept activation vectors. AAAI Conference on Artificial Intelligence (AAAI).

Rashidi, S., **Ehinger, K. A.**, Turpin, A., & Kulik, L. (2020). Optimal visual search based on a model of target detectability in natural images. Neural Information Processing Systems (NeurIPS).

Spratley, S., **Ehinger, K. A.**, & Miller, T. (2020). A closer look at generalisation in RAVEN. European Conference on Computer Vision (ECCV).

Zhang, J, Fang, S, **Ehinger, KA**, Haikun, W, Yang, W, Zhang, K & Yang, J 2018, 'Hypergraph optimization for salient region detection based on foreground and background queries', *IEEE Access*, vol. 6, pp. 26729-26741, doi:10.1109/ACCESS.2018.2834545

Ehinger, KA, Adams, WJ, Graf, EW & Elder, JH 2017, 'Local depth edge detection in humans and deep neural networks', *The IEEE International Conference on Computer Vision (ICCV) Workshops*, doi:10.1109/ICCV.2009.5459462

Aizenman, AM, Drew, T, **Ehinger, KA**, Georgian-Smith, D & Wolfe, JM 2017, 'Comparing search patterns in digital breast tomosynthesis and full-field digital mammography: an eye tracking study', *Journal of Medical Imaging*, vol. 4, no. 4, pp. 045501, doi:10.1117/1.JMI.4.4.045501

Ehinger, KA & Rosenholtz, R 2017, 'A general account of peripheral encoding also predicts scene perception performance', *Journal of Vision*, vol. 16, no. 2, pp. 13, doi:10.1167/16.2.13

Zhang, J, **Ehinger, KA**, Wei, H, Zhang, K & Yang, J 2017, 'A novel graph-based optimization framework for salient object detection', *Pattern Recognition*, vol. 62, pp. 39-50, doi:10.1016/j.patcog.2016.10.025

Ehinger, KA & Wolfe, JM 2016, 'When is it time to move to the next map? Optimal foraging in guided search', *Attention, Perception, & Psychophysics*, vol. 78, no. 7, pp. 2135-2151, doi:10.3758/s13414-016-1128-1

Ehinger, KA, Allen, K & Wolfe, JM 2016, 'Change blindness for cast shadows in natural scenes: Even informative shadow changes are missed', *Attention, Perception, & Psychophysics*, vol. 78, no. 4, pp. 978-987, doi:10.3758/s13414-015-1054-7

Xiao, J, **Ehinger, KA**, Torralba, A & Oliva, A 2016, 'SUN database: Exploring a large collection of scene categories', *International Journal of Computer Vision*, vol. 119, no. 1, pp. 3-22, doi:10.1007/s11263-014-0748-y

Sareen, P, **Ehinger, KA**, & Wolfe, JM 2016, 'A Change Detection Database for objects in natural indoor scenes', *Behavior Research Methods*, vol. 48, no. 4, pp. 1343-1348, doi:10.3758/s13428-015-0640-x

Sareen, P, **Ehinger, KA**, & Wolfe, JM 2015, 'Through the looking-glass: Objects in the mirror are less real', *Psychonomic Bulletin & Review*, vol. 22, no. 4, pp. 980-986, doi:10.3758/s13423-014-0761-8

Zhang, J, **Ehinger, KA**, Ding, J & Yang, J 2014, 'A prior-based graph for salient object detection', *2014 IEEE International Conference on Image Processing (ICIP)*, pp. 1175-1178, doi:10.1109/ICIP.2014.7025234

Xiao, J, Hays, J, Russel, BC, Patterson, G, **Ehinger, KA**, Torralba, A & Oliva, A 2013 'Basic level scene understanding: Categories, attributes and structures', *Frontiers in Psychology*, vol. 4, pp. 506, doi:10.3389/fpsyg.2013.00506

Xiao, J, **Ehinger, KA**, Oliva, A & Torralba, A 2012, 'Recognizing scene viewpoint using panoramic place representation', *2012 IEEE Conference on Computer Vision and Pattern Recognition*, pp. 2695-2702, doi:10.1109/CVPR.2012.6247991

Gouin, A, Brockmole, JR & **Ehinger, KA** 2012 'How visual and semantic information influence learning in familiar contexts', *Journal of Experimental Psychology: Human Perception and Performance*, vol. 38, no. 5, 1315-1327, doi:10.1037/a0028126

Rosenholtz, R, Huang, J & **Ehinger, KA** 2012, 'Rethinking the role of top-down attention in vision: Effects attributable to a lossy representation in peripheral vision', *Frontiers in Psychology*, vol. 3, pp. 13, doi:10.3389/fpsyg.2012.00013

Ehinger, KA & Oliva, A 2011, 'Canonical views of scenes depend on the shape of the space.', *33rd Annual Meeting of the Cognitive Science Society 2011 (CogSci 2011)*, pp. 2114-2119

Ehinger, KA, Xiao, J, Torralba, A & Oliva, A 2011, 'Estimating scene typicality from human ratings and image features', *33rd Annual Meeting of the Cognitive Science Society 2011 (CogSci 2011)*, pp. 2562-2567

Ehinger, KA & Altschuler, EL 2012, 'What did the early American presidents really look like? Gilbert Stuart portraits as a "Rosetta Stone"to the pre-photography era', *Perception*, vol. 40, no. 1, pp. 91-94, doi:10.1068/p6764

Xiao, J, Hays, J, **Ehinger, KA**, Oliva, A & Torralba, A 2010, 'SUN database: Large-scale scene recognition from abbey to zoo', *2010 IEEE Computer Society Conference on Computer Vision and Pattern Recognition*, pp. 3485-3492, doi:10.1109/CVPR.2010.5539970

Judd, T, **Ehinger, K**, Durand, F & Torralba, A 2009, 'Learning to predict where humans look', *2009 IEEE 12th International Conference on Computer Vision*, pp. 2106-2113, doi:10.1109/ICCV.2009.5459462

Ehinger, KA, Hidalgo-Sotelo, B, Torralba, A & Oliva, A 2009, 'Modelling search for people in 900 scenes: A combined source model of eye guidance', *Visual Cognition*, vol. 17, no. 6-7, pp. 945-978, doi:10.1080/13506280902834720

Ehinger, KA & Brockmole, JR 2008, 'The role of color in visual search in real-world scenes: Evidence from contextual cueing', *Perception & Psychophysics*, vol. 70, no. 7, pp. 1366-1378, doi:10.3758/PP.70.7.1366

Other Research Outputs

Xu, P, **Ehinger, KA**, Zhang, Y, Finkelstein, A, Kulkarni, SR & Xiao, J 2015, 'Turkergaze: Crowdsourcing saliency with webcam based eye tracking', *arXiv:1504.06755*

Xiao, J, Russell, BC, Hays, J, **Ehinger, KA**, Oliva, A & Torralba, A 2012, 'Basic level scene understanding: From labels to structure and beyond', *SIGGRAPH Asia 2012 Technical Briefs (SA '12)*, pp. 36, doi:10.1145/2407746.2407782

Invited Talks

Panelist, "Biometrics: The Evolving Law" at ITechLaw 2020 Global Technology Law Summit, Oct 19, 2020.

Panelist, Losing Lena at the University of Melbourne, Dec 19, 2019.

"Learning from large image datasets," Talk and panel participant at the Finding Ways to Make Unstructured Data Usable symposium presented by Data, Systems and Society Research Network (DSSRN) at the University of Melbourne, Nov 28, 2019.

Media

Interviewed for ABC News article: 'AI headshots are going viral on TikTok. Here's what to know before using one,' 24 Jul 2023, https://www.abc.net.au/everyday/ai-headshots-viral-tiktok-trend-body-dysmorphia/102624418