Scott C. Lowe

Summary

Highly accomplished research scientist with a Ph.D. in Neuroinformatics and over a decade of experience in interdisciplinary research bridging cognitive sciences, deep learning, and artificial intelligence. Proven track record in developing advanced ML models, leading innovative projects, supervising students, and publishing impactful research in multidisciplinary collaborations. Experienced in deep learning, real-time forecasting, and large-scale data processing.

Current position

since 2022 **Distinguished Postdoctoral Research Fellow**, *Vector Institute*, Toronto, Canada

- Developing novel methodologies for self-supervised representation learning.
- Developing multimodal ML models (vision, DNA, and text) to facilitate monitoring of global insect biodiversity, even on previously unseen species [Paper, Paper, Paper, Paper, Paper].
- Curated and released BIOSCAN-5M, a dataset of 5M samples of insects with paired image and DNA barcode data [Paper].
- Investigating and developing System 2 reasoning capabilities in Large Language Models [Paper].
- Developing real-time, interactive symbolic music generation models.

Responsibilities: Lead research projects, lead supervision of students, co-supervise students, develop tooling for running experiments used by the rest of the lab.
Advisors: Prof. Graham Taylor and Prof. Sageev Oore.

Education

2012 – 2017 **Doctor of Philosophy (Ph.D. in Neuroinformatics)**, *Institute for Adaptive and Neural Computation, School of Informatics, University of Edinburgh*, Edinburgh, UK
Thesis: Decoding information from neural populations in the visual cortex. Supervisors: Profs. Mark van Rossum, Stefano Panzeri, and Alex Thiele.

2011 – 2012 **MSc with Distinction, in Neuroinformatics by Research**, *University of Edinburgh*, Edinburgh, UK, *average 75.3% — for comparison, a Distinction at* $\geq 70\%$ *is approximately equivalent to* $\geq 3.75/4$ *US GPA*
Thesis: *An information theoretic analysis of perceptual learning data from macaque V1 and V4*. Supervisors: Prof. Alex Thiele and Prof. Stefano Panzeri.

2007 – 2011 **MSci with First Class Honours, in Natural Sciences (Mathematics and Physics)**, *Durham University*, Durham, UK, *average 73.4% — for comparison, a First Class at* $\geq 70\%$ *is approximately equivalent to* $\geq 3.75/4$ *US GPA*
Thesis: *On Artifical Neural Networks*, Supervisor: Dr. Ian Jermyn.

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Experience

2020 – 2022 **Postdoctoral Research Fellow (Full time)**, *Faculty of Computer Science, Dalhousie University*, Halifax, Canada

- Steered research objectives for deployment of deep learning methods on hierarchically-annotated seafloor imagery [Paper, Paper].
- Curated and released BenthicNet, a dataset of 11M seafloor habitat images from 24k sites around the world [Paper].

Advisor: Prof. Thomas Trappenberg

2019 – 2020 **Postdoctoral Research Fellow (Full time)**, *Faculty of Computer Science, Dalhousie University*, Halifax, Canada. Joint affiliation: Dept. of Electrical and Computer Engineering

- Applied deep learning to CPAP data in partnership with NovaResp, preemptively predicting sleep apneas, subsequently reducing apneas and hypopneas by 32% [Paper, Paper].
- Collaborated with FORCE, DeepSense, and OERA to segment echograms of tidal energy sites using deep learning, decreasing errors by 60% and halving manual labour [Paper].
- Initiated research agendas focused on applying ML to healthcare and environmental monitoring, demonstrating leadership in interdisciplinary projects.

Advisors: Prof. Sageev Oore, Prof. Kamal El-Sankary

2018 – 2019 **Postdoctoral Research Fellow (Full time)**, *Faculty of Computer Science, Dalhousie University*, Halifax, Canada. Joint affiliation: Vector Institute

- Research in novel deep learning methods by deploying logical operations in logit space, inspired by neuroscience [Paper, Paper].
- Controllable symbolic music generation [Paper].

Advisors: Prof. Sageev Oore, Prof. Thomas Trappenberg.

2018 – 2018 **Postdoctoral Research Fellow (Full time)**, *School of Psychology & School of Mathematics, University of Nottingham*, Nottingham, UK

Program synthesis for visual reasoning tasks [Paper]. Advisor: Prof. Mark van Rossum.

2017 – 2017 **Co-founder and CSO (Full time)**, *Cortirio*, London, UK

Co-founder and Chief Scientific Officer at Cortirio, developing a portable brain scanner for diagnosing traumatic brain injury. Backed by Entrepreneur First.

2015 – 2015 **Technical Research Assistant (Full time)**, *Rochefort Lab, Centre for Integrative Physiology, University of Edinburgh*, Edinburgh, UK

- Developed FISSA, an open source toolbox for source-separation of neuroscientific calcium imaging data [Paper].
- Developed internal tooling for data analysis, deployed by multiple labs at UoE [Paper].

Advisor: Prof. Nathalie Rochefort.

Publications

Selected papers

Dec, 2022 **Scott C. Lowe**, Robert Earle, Jason d'Eon, Thomas Trappenberg, Sageev Oore. "Logical Activation Functions: Logit-space equivalents of Probabilistic Boolean Operators". In *Proceedings of the Thirty-sixth Conference on Neural Information Processing Systems (NeurIPS 2022)*. arXiv:2110.11940. [OpenReview]

Apr, 2025 ZeMing Gong, Austin T. Wang, Xiaoliang Huo, Joakim Bruslund Haurum, **Scott C. Lowe**, Graham W. Taylor, Angel X. Chang. "CLIBD: Bridging Vision and Genomics for Biodiversity Monitoring at Scale". In *Proceedings of the Thirteenth International Conference on Learning Representations (ICLR 2025)*. arXiv:2405.17537. [OpenReview]

Dec, 2024 Zahra Gharaee*, **Scott C. Lowe***, ZeMing Gong*, Pablo Millan Arias*, Nicholas Pellegrino, Austin T. Wang, Joakim Bruslund Haurum, Iuliia Zarubiieva, Lila Kari, Dirk Steinke†, Graham W. Taylor†, Paul Fieguth†, Angel X. Chang†. "BIOSCAN-5M: A Multimodal Dataset for Insect Biodiversity". In *Proceedings of the Thirty-eighth Conference on Neural Information Processing Systems (NeurIPS 2024)*. arXiv:2406.12723. [OpenReview]

May, 2024 **Scott C. Lowe***, Benjamin Misiuk*, Isaac Xu*, Shakhboz Abdulazizov, Amit R. Baroi, Alex C. Bastos, Merlin Best, Vicki Ferrini, Ariell Friedman, Deborah Hart, Ove Hoegh-Guldberg, Daniel Ierodiaconou, Julia Mackin-McLaughlin, Kathryn Markey, Pedro S. Menandro, Jacquomo Monk, Shreya Nemani, John O'Brien, Elizabeth Oh, Luba Y. Reshitnyk, Katleen Robert, Chris M. Roelfsema, Jessica A. Sameoto, Alexandre C. G. Schimel, Jordan A. Thomson, Brittany R. Wilson, Melisa C. Wong, Craig J. Brown†, Thomas Trappenberg†. "BenthicNet: A global compilation of seafloor images for deep learning applications". *Scientific Data* **12**, 230 (2025). doi:10.1038/s41597-025-04491-1. arXiv:2405.05241.

Oct, 2024 **Scott C. Lowe**, "System 2 Reasoning Capabilities Are Nigh". Presented at the *System 2 Reasoning At Scale Workshop, NeurIPS 2024*. arXiv:2410.03662. [OpenReview]

Dec, 2025 Tiancheng Gao, **Scott C. Lowe**, Brendan Furneaux, Angel X Chang, Graham W. Taylor. "BarcodeMamba+: Advancing State-Space Models for Fungal Biodiversity Research". *Imageomics: Discovering Biological Knowledge from Images Using AI Workshop, NeurIPS 2025*. arXiv:2512.15931. [OpenReview]

Jun, 2024 **Scott C. Lowe***, Joakim Bruslund Haurum*, Sageev Oore†, Thomas B. Moeslund†, Graham W. Taylor†. "An Empirical Study into Clustering of Unseen Datasets with Self-Supervised Encoders". *Foundation Models in the Wild Workshop, ICML 2024*. arXiv:2406.02465. [OpenReview]

Additional papers

Dec, 2025 Sageev Oore*, Finlay Miller*, Chandramouli Shama Sastry, Sri Harsha Dumpala, Marvin F. da Silva, Daniel Oore, **Scott C. Lowe**. "A Loopy Framework and Tool for Real-time Human-AI Music Collaboration". *Artificial Intelligence for Music: Where Creativity Meets Computation Workshop, NeurIPS 2025*. [OpenReview]

Dec, 2025 John Quinto, **Scott C. Lowe**, Akshita Gupta, Johanna Orsholm, Prajakta Darade, Iuliia Zarubiieva, Brendan Furneaux, Tommi Mononen, Tomas Roslin, Graham W. Taylor. "BugSR: Improving Tiny Instance Segmentation on the MassID45 Dataset". *Imageomics: Discovering Biological Knowledge from Images Using AI Workshop, NeurIPS 2025*. [OpenReview]

Sep, 2025 Wu Lin, **Scott C. Lowe**, Felix Dangel, Runa Eschenhagen, Zikun Xu, Roger B. Grosse. "Understanding and Improving Shampoo and SOAP via Kullback-Leibler Minimization". *OPT 2025: Optimization for Machine Learning Workshop, NeurIPS 2025*. arXiv:2509.03378. [OpenReview]

Aug, 2025 ZeMing Gong, Chuanqi Tang, Xiaoliang Huo, Nicholas Pellegrino, Austin Wang, Graham W. Taylor, Angel X Chang, **Scott C. Lowe**†, Joakim Bruslund Haurum†. "Hyperbolic Multimodal Representation Learning for Biological Taxonomies". *2nd Beyond Euclidean Workshop: Hyperbolic and Hyperspherical Learning for Computer Vision Workshop, ICCV 2025*. arXiv:2508.16744.

July, 2025 Johanna Orsholm, John Quinto, Hannu Autto, Gaia Banelyte, Nicolas Chazot, Jeremy deWaard, Stephanie deWaard, Arielle Farrell, Brendan Furneaux, Bess Hardwick, Nao Ito, Amlan Kar, Oula Kalttopää, Deirdre Kerdraon, Erik Kristensen, Jaclyn McKeown, Tommi Mononen, Ellen Nein, Hanna Rogers, Tomas Roslin, Paula Schmitz, Jayme Sones, Maija Sujala, Amy Thompson, Evgeny V. Zakharov, Iuliia Zarubiieva, Akshita Gupta, **Scott C. Lowe**, Graham W. Taylor. "A multi-modal dataset for insect biodiversity with imagery and DNA at the trap and individual level". *Imageomics: Discovering Biological Knowledge from Images Using AI Workshop, NeurIPS 2025*. arXiv:2507.06972. [OpenReview]

May, 2025 Alyson East, Elizabeth G. Campolongo, Luke Meyers, S. M. Rayeed, Samuel Stevens, Iuliia Zarubiieva, Isadora E. Fluck, Jennifer C. Girón, Maximiliane Jousse, **Scott Lowe**, Kayla I. Perry, Isabelle Betancourt, Noah Charney, Evan Donoso, Nathan Fox, Kim J. Landsbergen, Ekaterina Nepovinnykh, Michelle Ramirez, Parkash Singh, Khum Thapa-Magar, Matthew Thompson, Evan Waite, Tanya Berger-Wolf, Hilmar Lapp, Paula Mabee, Graham Taylor, Sydne Record. "Optimizing Image Capture for Computer Vision-Powered Taxonomic Identification and Trait Recognition of Biodiversity Specimens". *Methods in Ecology and Evolution*, 16, 2260–2275. doi:10.1111/2041-210X.70140.

Feb, 2025 Monireh Safari*, Pablo Millan Arias*, **Scott C. Lowe**, Lila Kari, Angel X. Chang, Graham W. Taylor. "Enhancing DNA Foundation Models to Address Masking Inefficiencies". *Artificial Intelligence for Nucleic Acids (AI4NA) Workshop, ICLR 2025*. arXiv:2502.18405. [OpenReview]

Oct, 2024 Dirk Steinke, Sujeevan Ratnasingham, Jireh Agda, Hamzah Ait Boutou, Isaiah Box, Mary Boyle, Dean Chan, Corey Feng, **Scott C. Lowe**, Jaclyn T.A. McKeown, Joschka McLeod, Alan Sanchez, Ian Smith, Spencer Walker, Catherine Y.-Y. Wei, Paul D.N. Hebert. "Towards a Taxonomy Machine – A Training Set of 5.6 Million Arthropod Images". Data **2024**, 9(11), 122. doi:10.3390/data9110122

Jun, 2024 Isaac Xu, Benjamin Misiuk, **Scott C. Lowe**, Martin Gillis, Craig J. Brown, Thomas Trappenberg. "Hierarchical Multi-Label Classification with Missing Information for Benthic Habitat Imagery," In Proceedings of the *2024 International Joint Conference on Neural Networks (IJCNN 2024)*. doi:10.1109/IJCNN60899.2024.10650176. arXiv:2409.06618.

Dec, 2023 Zahra Gharaee*, ZeMing Gong*, Nicholas Pellegrino*, Iuliia Zarubiieva, Joakim Bruslund Haurum, **Scott C. Lowe**, Jaclyn T.A. McKeown, Chris C.Y. Ho, Joschka McLeod, Yi-Yun C. Wei, Jireh Agda, Sujeevan Ratnasingham, Dirk Steinke†, Angel X. Chang†, Graham W. Taylor†, Paul Fieguth†. "A Step Towards Worldwide Biodiversity Assessment: The BIOSCAN-1M Insect Dataset". In *Proceedings of the Thirty-seventh Conference on Neural Information Processing Systems (NeurIPS 2023)*. arXiv:2307.10455. [OpenReview]

Nov, 2023 Pablo Millan Arias*, Niousha Sadjadi*, Monireh Safari*, ZeMing Gong, Austin T. Wang, Joakim Bruslund Haurum, Iuliia Zarubiieva, Dirk Steinke, Lila Kari, Angel X. Chang, **Scott C. Lowe**†, Graham W. Taylor†. "BarcodeBERT: Transformers for Biodiversity Analysis". *Self-Supervised Learning — Theory and Practice Workshop, NeurIPS 2023*. arXiv:2311.02401. [OpenReview]

Oct, 2023 Meagan Sinclair, Hamed Hanafi Alamdari, Julia Paffile, Kamal El-Sankary, **Scott Lowe**, Stephen Driscoll, Sageev Oore, Heather Tomson, Gregory Begin, Guillermo Aristi, Michael Schmidt, David Roach, Thomas Penzel, Ingo Fietze, Sanjay R Patel, Reena Mehra, Debra Morrison. "The Beginning of the AI-Enabled Preventative PAP Therapy Era: A First-in-Human Proof of Concept Interventional Study". *IEEE Transactions on Biomedical Engineering*. doi:10.1109/TBME.2023.3263379.

Sep, 2023 Hamed Hanafi, Julia Paffile, Meagan Sinclair, Kamal El-Sankary, **Scott Lowe**, Sageev Oore, Stephen Driscoll, Thomas Penzel, Ingo Fietze, Sanjay Patel, Reena Mehra, Debra Morrison. "Prevention of obstructive apnea events with machine learning". *European Respiratory Journal*. **62**(67) PA573. doi:10.1183/13993003.congress-2023.PA573.

Sep, 2022 Isaac Xu, **Scott C. Lowe**, Thomas Trappenberg. "Label-Free Monitoring of Self-Supervised Learning Progress". *2022 IEEE Canadian Conference on Electrical and Computer Engineering (CCECE)*, Halifax, Nova Scotia, Canada, 2022, pp 78–84. doi:10.1109/CCECE49351.2022.9918377.

Aug, 2022 **Scott C. Lowe**, Louise P. McGarry, Jessica Douglas, Jason Newport, Sageev Oore, Christopher Whidden, Daniel J. Hasselman. "Echofilter: A Deep Learning Segmentation Model to Improve the Automation, Standardization, and Timeliness for Post-Processing Echosounder Data in Tidal Energy Streams". *Frontiers in Marine Science*. **9**:867857. doi:10.3389/fmars.2022.867857. arXiv:2202.09648.

Jul, 2022 Hamed Hanafi Alamdari, Luke Hacquebard, Stephen Driscoll, Kamal El-Sankary, David C Roach, Robin LeBlanc, **Scott Lowe**, Sageev Oore, Thomas Penzel, Ingo Fietze, Michael Schmidt, Debra Morrison. "High Frequency-Low Amplitude Oscillometry: Continuous Unobtrusive Monitoring of Respiratory Function on PAP Machines". In *IEEE Transactions on Biomedical Engineering*, **69**(7), pp. 2202–2211. doi:10.1109/TBME.2021.3138965.

Nov, 2021 **Scott C. Lowe**, Thomas Trappenberg, Sageev Oore. "LogAvgExp Provides a Principled and Performant Global Pooling Operator". arXiv:2111.01742.

Nov, 2019 Lu Yihe, **Scott C. Lowe**, Penelope A. Lewis, Mark C. W. van Rossum. "Program synthesis performance constrained by non-linear spatial relations in Synthetic Visual Reasoning Test". arXiv:1911.07721.

Jun, 2019 Nicholas Meade*, Nicholas Barreyre*, **Scott C. Lowe**, Sageev Oore. "Exploring Conditioning for Generative Music Systems with Human-Interpretable Controls". In *Proceedings of the 10th International Conference on Computational Creativity (ICCC 2019)*. arXiv:1907.04352.

Feb, 2018 Sander W. Keemink*, **Scott C. Lowe***, Janelle M. P. Pakan, Mark C. W. van Rossum, Nathalie L. Rochefort. "FISSA: A neuropil decontamination toolbox for calcium imaging signals". *Scientific Reports*, **8**. doi:10.1038/s41598-018-21640-2.

Jan, 2018 Daniel Zaldivar, Jozien Goense, **Scott C. Lowe**, Nikos K. Logothetis, Stefano Panzeri. "Dopamine is signaled by mid-frequency oscillations and boosts output-layers visual information in visual cortex". *Current Biology*, **28**(2). doi:10.1016/j.cub.2017.12.006.

Aug, 2016 Janelle M. P. Pakan, **Scott C. Lowe**, Evelyn Dylda, Sander W. Keemink, Stephen P. Currie, Christopher A. Coutts, Nathalie L. I. Rochefort. "Behavioral-state modulation of inhibition is context-dependent and cell type specific in mouse visual cortex". *eLIFE*, **5**:e14985. doi:10.7554/eLife.14985.

Sep, 2015 Michel Besserve, **Scott C. Lowe**, Nikos, K. Logothetis, Bernhard Schölkopf, Stefano Panzeri. "Shifts of gamma phase across primary visual cortical sites reflect dynamic stimulus modulated information transfer". *PLoS Biology*, **13**(9): e1002257. doi:10.1371/journal.pbio.1002257.

Jul, 2013 **Scott C. Lowe**, Xing Chen, Mark C.W. van Rossum, Stefano Panzeri, Alex Thiele. "Decoding spiking activity in V4, but not V1, correlates with behavioural performance in perceptual learning task". *Twenty Second Annual Computational Neuroscience Meeting: CNS*2013*, Paris, France. *BMC Neuroscience* 2013, **14**(Suppl 1):P385 doi:10.1186/1471-2202-14-S1-P385.

Supervision experience

since 2025 **ZeMing Gong**, *Ph.D. in Computer Science*, Simon Fraser University, Topic: Multimodal hyperbolic embeddings for insect biodiversity modelling.
Co-supervised with Prof. Angel Chang

since 2025 **Tiancheng Gao**, *Master of Computer Science*, University of Guelph, Topic: State space models (Mamba) for biodiversity modelling.
Co-supervised with Prof. Graham Taylor

2025 **Xiaoliang Huo**, *Ph.D. in Computer Science*, Simon Fraser University, Topic: Multimodal hyperbolic embeddings for insect biodiversity modelling.
Co-supervised with Prof. Angel Chang

2025 – 2025 **Kevin Kasa**, *Master of Computer Science*, University of Guelph, Topic: Set learning for set-valued classifiers.
Co-supervised with Prof. Graham Taylor

2024 – 2025 **ZeMing Gong**, *Master of Computer Science*, Simon Fraser University, Topic: Multimodal alignment for insect biodiversity modelling.
Co-supervised with Prof. Angel Chang

since 2024 **Monireh Safari**, *Ph.D. in Computer Science*, University of Waterloo, Self-supervised learning for barcode DNA classification.
Co-supervised with Prof. Lila Kari

since 2024 **Niousha Sadjadi**, *Ph.D. in Computer Science*, University of Waterloo, Self-supervised learning for barcode DNA classification.
Co-supervised with Prof. Lila Kari

2023 – 2025 **John Quinto**, *Master of Computer Science*, University of Guelph, Topic: Creating instance segmentation masks for bulk images of insects.
Co-supervised with Prof. Graham Taylor

since 2023 **Finlay Miller**, *Master of Computer Science*, Dalhousie University, Topic: Interactive symbolic music generation with smart looping.
Co-supervised with Prof. Sageev Oore

2023 – 2024 **Pablo Millán Arias**, *Ph.D. in Computer Science*, University of Waterloo, Thesis: "Deep Unsupervised Learning for Biodiversity Analyses".
Co-supervised with Prof. Lila Kari

2021 – 2022 **Amit Baroi**, *Master of Resource & Environmental Management*, Dalhousie University, and DeepSense Data Science Intern, Topic: Building a global benthic habitat imagery dataset.
Co-supervised with Prof. Thomas Trappenberg

2020 – 2022 **Isaac Xu**, *Master of Computer Science*, Dalhousie University, Thesis: "Towards a label-free and representation-based metric for evaluating machine learning models".
Co-supervised with Prof. Thomas Trappenberg

2020 – 2022 **Shakhboz Abdulazizov**, *Master of Computer Science*, Dalhousie University, Thesis: "Comparing transfer-learning and self-supervised learning for ocean floor image classification".
Co-supervised with Prof. Thomas Trappenberg

2019 – 2020 **Robert Earle**, *Honours Bachelor of Computer Science & Statistics*, Dalhousie University, Thesis: "Behaviour Of Higher Order Activation Functions".
Co-supervised with Prof. Sageev Oore

2018 – 2019 **Nicholas Barreyre**, *Combined Honours Bachelor of Science*, Dalhousie University, Thesis: "Conditional Sequence Generation: Controlling Neural Language Models For Music And Text".
Co-supervised with Prof. Sageev Oore

2018 – 2019 **Nicholas Meade**, *Honours Bachelor of Computer Science*, Dalhousie University, Thesis: "Conditional Sequence Generation: Controlling Neural Language Models For Music And Text".
Co-supervised with Prof. Sageev Oore

Grants, honours & awards

2022 Awarded Mitacs Accelerate grant IT27877: Artificial intelligence driven monitoring and prediction of true sleep health on CPAP machines to improve patient care and reduce the harm of obstructive sleep apnea. *Total value: CAD 180,000.*

2021 Compute Canada Resources for Research Groups (RRG) competition, 2021. Project: "Global Benthic Habitats". *Value: CAD 20,059.*

2020 Awarded Mitacs Accelerate grant IT19053: Monitoring and Analysis of COVID-19 Acute Respiratory Distress Syndrome on Ventilators. *Total value: CAD 210,000.*

2019 Awarded Mitacs Accelerate grant IT16140: Active Learning for Fish School Recognition in Echograms in the Bay of Fundy. *Value: CAD 15,000.*

2018 Awarded an NVIDIA GPU Grant (Titan V).

2017 Placed 8th out of 91 in NIPS 2017: Non-targeted Adversarial Attack competition, NIPS2017 Conference Competition Track, organised by Google Brain and Kaggle.

2016 Awarded a entrepreneurial fellowship with Entrepreneur First, London.

2015 Placed 57th out of 1049 in the National Data Science Bowl plankton species classification challenge, hosted by Kaggle.

2014 Placed 16th out of 504 in the American Epilepsy Society Seizure Prediction Challenge, hosted by Kaggle.

2013 Winner of "Most Viable Business Idea" award, Amazon Scotland Hackathon 2013.

2011 Awarded a 4-year scholarship by the University of Edinburgh School of Informatics Doctoral Training Centre in Neuroinformatics, with funding from grants EP/F500385/1 and BB/F529254/1 from the UK Engineering and Physical Sciences Research Council (EPSRC), UK Biotechnology and Biological Sciences Research Council (BBSRC), and the UK Medical Research Council (MRC).

Invited talks

Feb, 2025 **Scott C. Lowe**. "BIOSCAN-5M: A Multimodal Dataset for Insect Biodiversity" Invited talk at the Voxel51 *AI, Machine Learning and Computer Vision Meetup*. [abstract], [recording].

Feb, 2025 **Scott C. Lowe**. "BIOSCAN-5M: Multimodal biodiversity monitoring with images and DNA barcodes". Invited talk at the GrUVi Lab, Simon Fraser University, Vancouver, Canada.

Nov, 2024 **Scott C. Lowe**. "Multimodal biodiversity monitoring with images and DNA barcodes". Invited talk at the Visual Analysis and Perception Group, Aalborg University, Aalborg, Denmark.

Nov, 2024 **Scott C. Lowe**. "Multimodal biodiversity monitoring with images and DNA barcodes" Invited talk at the Pioneer Centre for Artificial Intelligence, Copenhagen, Denmark. [abstract].

Apr, 2024 **Scott C. Lowe**. "Self-Supervised Learning Methodology". Presented at the *Self-Supervised Learning Bootcamp*, Vector Institute, Toronto, Canada, 2024.

Sep, 2023 **Scott C. Lowe**. "Single-modal self-supervised learning methods & background". Presented at the *Self-Supervised Learning Bootcamp*, Vector Institute, Toronto, Canada, 2023.

Feb, 2023 **Scott C. Lowe**. "Tutorial: Self-supervised learning methods". Presented at the *Self-Supervised Learning Reading Group*, Vector Institute, Toronto, Canada, 2023.

Jul, 2022 **Scott C. Lowe**, Robert Earle, Jason d'Eon, Thomas Trappenberg, Sageev Oore. "Logical Activation Functions" (Spotlight talk). Presented at the *Beyond Bayes: Paths Towards Universal Reasoning Systems Workshop, 39th International Conference on Machine Learning (ICML 2022)*, Baltimore, Maryland, USA, 2022.

May, 2015 **Scott C. Lowe**, Daniel Zaldivar, Yusuke Murayama, Mark C. W. van Rossum, Nikos K. Logothetis, Stefano Panzeri. "What does LFP encode?". Presented at the *CINPLA Workshop: "Inferring network activity from LFPs"*, University of Oslo, Oslo, Norway.

Jan, 2014 **Scott C. Lowe**, Daniel Zaldivar, Yusuke Murayama, Mark C. W. van Rossum, Nikos K. Logothetis, Stefano Panzeri. "Independent channels of information in visual cortical Local Field Potentials". Presented at the *Institute for Adaptive and Neural Computation Workshop, Jan 14, 2014*, Edinburgh.

Technical Skills

Programming	Python, MATLAB, Bash/shell, regex, C/C++
ML	PyTorch, TensorFlow, PyTorch-Lightning, Scikit-learn, fastAI, Theano, Lasagne
Development	Git, pre-commit, TDD, CI/CD, GHA
Job Scheduler	Slurm, LSF
Cloud comp.	AWS, GCP
Web	PHP, JavaScript, AJAX, HTML5, CSS3
Markup	Markdown, rST, YAML, JSON, TOML, XML
Database	SQL, MySQL

Open source projects

2024 **bioscan-dataset**, *PyTorch torchvision-style datasets for BIOSCAN-1M and BIOSCAN-5M*, available on GitHub and PyPI (8k downloads).

2024 **wandb-preempt**, *Checkpointer for handling preempted Weights & Biases sweeps on Slurm*, available on GitHub and PyPI (3k downloads).

2024 **PyTorch Experiment Template**, *A template repository to use for pytorch projects and experiments*, available on GitHub.

2022 **Echofilter**, *Automatically segment echograms (pictures of the water column acquired with echosound) to identify entrained air, sea surface, and seafloor boundaries*, available on GitHub.

2020 **Python Template Repo**, *A template repository to use for python projects and packages*, available on GitHub.

2018 **FISSA**, *A Python library for decontaminating somatic signals from 2-photon calcium imaging data*, available on GitHub and PyPI (66k downloads).

2016 **Superbar**, *Multi-colour bar charts for MATLAB, including customisable error bars and significance comparisons*, available on GitHub, and MATLAB FileExchange (3k downloads).

2016 **MOPI: MATLAB/Octave Package Installer**, *A simple and flexible package manager for both MATLAB and Octave*, available on GitHub.

2015 **MATLAB Schemer**, *A colour scheme manager for MATLAB*, available on GitHub, and through MATLAB FileExchange (130k downloads).

2013 **Colorlab**, *Perceptually uniform colormap generation*, available on GitHub.

Patents

2024 Hamed Hanafialamdari, **Scott C. Lowe**, Guillermo A. Suarez, Gregory E. A. Begin, Brendan I. L. Brady, Sarah E. Reeve, Meagan M. Sinclair, Joel Liederman, Seyedehnajmeh Sadatnejad, Kazi A. Hasan, Rajwant S. Sodhi. (Novaresp Technologies Inc), "Digital twin and artificial intelligence (AI) models for personalization and management of breathing assistance ". WO2024192512A1.

2023 Hamed Hanafialamdari, **Scott Lowe**, Stephen Driscoll, Luke Hacquebard, David Cecil Roach, Klaus Michael Schmidt. (Novaresp Technologies Inc), "Method and apparatus for determining and/or predicting sleep and respiratory behaviours for management of airway pressure". US11612708B2.

Conference and Seminar Participation

2025 Reviewer for *The Fourteenth International Conference on Learning Representations (ICLR 2026)*.

2025 Reviewer for *Thirty-ninth Conference on Neural Information Processing Systems (NeurIPS 2025)*.

2025 Reviewer for *The 42nd International Conference on Machine Learning (ICML 2025)*.

2024 Reviewer for *The Thirteenth International Conference on Learning Representations (ICLR 2025)*.

2024 Reviewer for *Thirty-eighth Conference on Neural Information Processing Systems (NeurIPS 2024)*.

2022 – 2024 Vector Institute's *Self-Supervised Learning and Foundation Models* Reading Group Organizer.

2023 Reviewer for *Thirty-seventh Conference on Neural Information Processing Systems (NeurIPS 2023)*.

2021 Reviewer for eLife.

Media coverage

Nov, 2021 "Dr. Scott C. Lowe", Lodestar profile, *Journal of Ocean Technology*, **16**:3.

Nov, 2021 "Predicting depth of entrained air and seafloor boundaries: DeepSense's Echofilter Model", Trade Winds profile, *Journal of Ocean Technology*, **16**:3.

Mar, 2021 "AI software developed in N.S. provides glimpse into wild and murky Bay of Fundy", News article, *CBC*.

Online Presence

G Scholar Scott C. Lowe

Blog scottclowe.com

GitHub github.com/scottclowe

LinkedIn linkedin.com/in/scottclowe

StackOverflow stackoverflow.com/users/1960959/scottclowe

Kaggle kaggle.com/scottclowe, Kaggle Competitions Master