Brennan Nichyporuk

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EDUCATION:

Master of Science   **August 2021**

Thesis: Engineering Deep Learning Systems for Robust and Accurate Focal Pathology Segmentation and Detection
Supervisor: Tal Arbel
McGill University, Montreal, QC
- CGPA: 3.78 / 4.00

Bachelor of Software Engineering   **April 2018**
McGill University, Montreal, QC
- CGPA: 3.60 / 4.00

TECHNICAL SKILLS:

Operating Systems: Linux, OSX, Windows
Software Development Tools / Methodologies: Eclipse, Git, JUnit, Vim, Scrum
Programming Languages: Python, Java, C, Bash
Programming Libraries: PyTorch, TensorFlow, NumPy

EXPERIENCE:

Research Scientist   **February 2022 - Present**
Mila (Quebec AI Institute), Montreal QC
- Supports the development of accurate, robust, generalizable, and reproducible machine learning code, permitting their safe deployment in real clinical settings.
- Develops tools to ensure quality control, to maximum leveraging available hardware, and to more easily apply the latest advances in the medical image analysis literature.
- Develops common software pipelines for accessing, processing, and utilizing medical image datasets acquired from patient data.
- Collaborates with graduate students to help write papers for publication.
- Interfaces and meets with clinical collaborators and end users.

Research Assistant   **September 2020 - December 2021**
Probabilistic Vision Group, McGill University, Montreal QC
- Advised and assisted graduate students with engineering deep learning systems. Specifically: (1) Ensured that best practices were followed when applying deep learning to research problems; (2) Helped to develop and apply a rigorous experimental methodology for model development; and (3) Reinforced and helped apply key software engineering principles to projects.
- Collaborated with graduate students on every step of the research process (literature review, model development and validation, wrote papers for publication).
- Developed a well-validated pipeline for deep learning research. Forms the basis of the pipeline now used by nearly all students in the probabilistic vision group.
- Developed and optimized code to compute computationally costly training/validation metrics using multi-processing.
- Ensured that student research was reproducible by reviewing experiment code, methodology, and by establishing well-optimized baselines.
- Assisted with research grant applications. Prepared and submitted an application for access to compute cluster resources.
- Purchased over $100,000 in computational resources tailored to the lab's research needs. Setup and configured each system for student use.
- Coordinated lab meetings, journal clubs, and other lab events.

Software Engineering Internship - WebSphere Analytics & Tooling   **May 2016 - August 2017**
IBM Canada - Markham, Ontario
- Helped create the Eclipse MicroProfile Metrics specification. Contributed to the design of the REST API component of the specification.
- Designed and developed the Websphere Liberty implementation of the REST API component of the MicroProfile Metrics specification.
- Developed a Configuration as a Service plugin to facilitate integration of Cloud Analytics Services into on-prem products.
- Coordinated effort among several teams to accommodate updates to IBM's Cloud Analytics Services. Developed a process and added new functionality to the Configuration as a Service to ease transition.

- Designed and developed an automated end-to-end test to verify the functionality of Cloud Analytics Services for WebSphere Liberty.
- Worked within a team to develop a service strategy for the recently released Open Liberty platform.
- Maintained and improved the tools responsible for packaging developer's code changes into installable iFixes. These tools automated the complex process of calculating file dependencies, storing archive history, kicking off integration tests, as well as acquiring and integrating the information required to correctly package the iFix.
- Setup a linux environment (HTTP Server, Custer of Application Servers, Database) from scratch to host a full stack web application.

PUBLICATIONS:
- Durso-Finley, J. D., Falet, J.-P. R., **Nichyporuk, B.**, Arnold, D., and Arbel, T. Personalized prediction of future lesion activity and treatment effect in multiple sclerosis from baseline mri. Medical Imaging with Deep Learning, 2022. (Accepted).
- Falet, J.-P. R., Durso-Finley, J., **Nichyporuk, B.**, Schroeter, J., Bovis, F., Sormani, M.-P., Precup, D., Arbel, T., and Arnold, D. L. Estimating treatment effect for individuals with progressive multiple sclerosis using deep learning. medRxiv, 2021.
- **Nichyporuk, B.**, Cardinell, J., Szeto, J., Mehta, R., Tsaftaris, S., Arnold, D. L., and Arbel, T. Cohort Bias Adaptation in Aggregated Datasets for Lesion Segmentation. In Domain Adaptation and Representation Transfer, and Affordable Healthcare and AI for Resource Diverse Global Health. Springer, 2021, pp. 101–111. (Best Paper Award)
- **Nichyporuk, B.**, Szeto, J., Arnold, D., and Arbel, T. Optimizing Operating Points for High Performance Lesion Detection and Segmentation Using Lesion Size Reweighting. In Medical Imaging with Deep Learning, 2021. Eprint https://arxiv.org/abs/2107.12978arXiv:2107.12978 (Short Paper).
- **Nichyporuk, B.**, Vasilevski, K., Hu, A., Myers-Colet, C., Car- dinell, J., Szeto, J., Falet, J.-P., Zimmermann, E., Schroeter, J., Arnold, D. L., et al. Consensus learning with multi-rater labels for segmenting and detecting new lesions. MSSEG-2 challenge proceedings: Multiple sclerosis new lesions segmentation challenge using a data management and processing infrastructure, 2021, 85. (Short Paper).
- Vadacchino, S., Mehta, R., Sepahvand, N. M., **Nichyporuk, B.**, Clark, J. J., and Arbel, T. Had-net: A hierarchical adversarial knowledge distillation network for improved enhanced tumour segmentation without post-contrast images. arXiv preprint arXiv:2103.16617, 2021.
- Bouthillier, X., Delaunay, P., Bronzi, M., Trofimov, A., **Nichyporuk, B.**, Szeto, J., Mohammadi Sepahvand, N., Raff, E., Madan, K., Voleti, V., et al. Accounting for variance in machine learning benchmarks. Proceedings of Machine Learning and Systems 3, 2021.

ACTIVITIES:
- Reviewer for Medical Image Analysis (Journal)
- Collaborator with DELPHI

AWARDS:
- McGill Engineering Undergraduate Student Masters Award   **2018 - 2020**
- Summer Undergraduate Research in Engineering   **2018**