

Preface

This volume contains the Proceedings of the Third Conference on Medical Imaging with Deep Learning – MIDL 2020. The conference was organized jointly by the University of Sherbrooke, Mila, and a team of program chairs from McGill University, Canada; Erasmus MC Rotterdam, The Netherlands; and ETS Montreal, Canada. The conference was held between July 6 and 9, 2020, initially planned at the Palais des Congrès de Montréal and finally held virtually due to the COVID-19 pandemic. The virtual conference has had 3,575 registered participants. Oral sessions and keynotes were broadcast live in interactive Zoom webinars as well as on YouTube. The YouTube number of views was 2,475 on Day 1, 1,053 on Day 2, and 569 on Day 3. Interactivity, including poster presentations, was made on the Zoom platform and in dedicated chat channels for each paper. All recorded sessions and long, short and teaser presentations remain available at <https://2020.midl.io/>.

MIDL 2020 attracted world-class researchers, scientists, engineers, as well as clinicians, who are keen on developing novel algorithms to solve medical imaging problems using deep learning techniques. The conference had two submission tracks: *full paper* and *short papers*. Through the OpenReview system, 148 full paper and 106 short paper submissions were received. This is an increase of 26% in full papers with respect to 2019 and a decrease of 33% on short papers. For both tracks, the review process was double blind. All submitted papers were on display at the OpenReview system from the time of their submission. All reviews, rebuttals, and further discussions were made publicly available after the decision process and remain available at <https://openreview.net/group?id=MIDL.io/2020/Conference>. Authors were, however, given the option of removing rejected submissions from the system.

The review process was initiated by the Program Chairs (PC), and was handled by one primary Area Chair (AC) for each paper. The AC assigned ten candidate reviewers per paper, upon which a matching algorithm assigned 4 reviewers per paper taking AC preference, reviewer preference, and reviewer expertise on the topic of the paper into account. After all reviews and rebuttals, for full papers, were received, area chairs wrote an additional metareview and provided their recommendation to accept or reject based on the submission, the anonymous reviews, and the rebuttals. Review and metareview reports for each paper were checked by one Program Chair and all papers where the decision of the reviewers and AC was not unanimous were discussed in detail among all four Program Chairs. Final decisions were based on careful examination of the submission, AC and reviewer comments, the rebuttals and interactions during the discussion period. One accepted submission of a full paper has withdrawn by the authors after the decisions were made. The final acceptance rate of the full paper track is 43.9% (65/148). Among the 65 accepted full paper articles, 18 were selected as oral presentations (12.2% of all submissions), based on reviewer and AC proposals, and 47 for poster presentations. Among the 106 submitted short papers, 41 were accepted as posters at the conference, 40 were presented. The final

acceptance rate of the short paper track is 37.7% (40/106). The proceedings of machine learning research only contains the accepted full paper submissions, the short papers can be found in the OpenReview system and in the corresponding arXiv compendium available at <https://arxiv.org/abs/2007.02319>.

An independent award committee composed of members of the program committee, *Albert C.S. Chung, Mattias P. Heinrich, Ipek Oguz*, who had no conflicts of interest with any of the authors of the oral presentations, has selected one best paper award along with three runner-ups for best paper awards. The MIDL 2020 best paper award recognizes the highest quality full-length paper presented at the conference. The focus lies on novel methodological concepts with great potential of medical impact. All full papers that are presented as orals at MIDL 2020 were eligible.

The review process included a mechanism for Area Chairs to score the quality of the reviews. Based on these scores, five reviewers received an outstanding reviewer award. These reviewers are marked with an asterisk in the list of reviewers below, while honorable mentions are marked in bold.

The PC and organizing chairs would like to thank the OpenReview staff for their support in hosting the submission site, TPMS for their support in assigning papers to AC and reviewers, and PMLR staff for their support in finalizing these proceedings.

Most importantly, we would like to thank all authors and all our Area Chairs and Reviewers for their hard work in preparing and helping us shape the technical program of MIDL 2020. The conference and the current proceedings are a result of their work.

Finally, we would like to thank all our sponsors for the financial support, which made the MIDL 2020 conference possible. We look forward to seeing you in Lübeck, in 2021, for the next edition of MIDL.

July 9, 2020

The Editorial Team:

Tal Arbel
McGill University, Canada
arbel@cim.mcgill.ca

Ismail Ben Ayed
ETS Montreal, Canada
ismail.benayed@etsmtl.ca

Marleen de Bruijne
Erasmus MC Rotterdam, The Netherlands
University of Copenhagen, Denmark
marleen.debruijne@erasmusmc.nl

Maxime Descoteaux
Université de Sherbrooke, Canada
maxime.descoteaux@usherbrooke.ca

Herve Lombaert
ETS Montreal, Canada
herve.lombaert@etsmtl.ca

Christopher Pal
Polytechnique Montreal, Canada
christopher.pal@polymtl.ca

Best paper Award

“Addressing The False Negative Problem of MRI Reconstruction Networks by Adversarial Attacks and Robust Training”, *Kaiyang Cheng, Francesco Calivà, Rutwik Shah, Misung Han, Sharmila Majumdar, Valentina Pedoia.*

Runner-ups for best paper Award (in arbitrary order)

“MAC-ReconNet: A Multiple Acquisition Context based Convolutional Neural Network for MR Image Reconstruction using Dynamic Weight Prediction”, *Sriprabha Ramnarayanan, Balamurali Murugesan, Keerthi Ram, Mohanasankar Sivaprakasam;*

“Extending Unsupervised Neural Image Compression With Supervised Multitask Learning”, *David Tellez, Diederik Hoppener, Cornelis Verhoef, Dirk Grunhagen, Pieter Nierop, Michal Drozdal, Jeroen van der Laak, Francesco Ciompi;*

“Tensor Networks for Medical Image Classification”, *Raghavendra Selvan, Erik B Dam.*

Area Chairs

Aasa Feragen, Adrian Dalca, Albert C.S. Chung, Alejandro Frangi, Bjoern H Menze, Caroline Petitjean, Carole Sudre, Christian Desrosiers, Enzo Ferrante, Geert Litjens, Gustavo Carneiro, Holger Roth, Ipek Oguz, Ivana Isgum, Jose Dolz, José V Manjón, Juan Eugenio Iglesias, Maria Vakalopoulou, Martin Urschler, Mattias P. Heinrich, Pierre-Marc Jodoin, Pierrick Coupé, Shanshan Wang, S. Kevin Zhou, Tom Vercauteren, Qian Wang, Qi Dou, Yuri Boykov.

Reviewers (*Outstanding reviewer award winners marked with an asterisk, honorable mentions in bold*)

Adrian Galdran, Adrien Depeursinge, Ahmad Chaddad, Ahmed Fetit, Ahmet Ekin, Akif Tosun, Akshay Pai, Alain Jungo, Alberto Gomez, Alessa Hering, Alperen Degirmenci, Amir Abdi, Amir Jamaludin, Amirhossein Bayat, Anderson Maciel, Andreas Schuh, Andrew King, Antoine Theberge, Antong Chen, Arinbjörn Kolbeinsson, Arnav Bhavsar, Ayushi Sinha, Azam Hamidinekoo, Bart Liefers, Bartłomiej Papiez, Ben Duffy, Bennett Landman, Bernhard Kainz, Can Zhao, Carl-Fredrik Westin, Carole Lartizien, Cem Deniz, Chao Chen, Charles Authier, Charles Hatt, Cheng Chen, Chenglong Wang, Cher Bass, Christoph Baur, Christopher Bridge, Colin Jacobs, Cristian Lorenz, Da Ma, Daniele Ravi, **Darko Štern**, David Owen, David Romo-Bucheli, Devinder Kumar, Dogu Baran Aydogan, Dong Nie, Dong Yang, Priya Aggarwal, Edward Kim, Elham Taghizadeh, Elsa Angelini, Emma Robinson, Erik Bekkers, **Erwan Kerrien**, Esther Bron, **Estibaliz Gómez de Mariscal**, **Fabian Balsiger**, **Fausto Milletari***, Felix Ambellan, **Felix Bragman**, Florian Dubost, Francesco Ciompi, Frithjof Kruggel, German Gonzalez, Gijs van Tulder, Guang Yang, Guillem Cucurull, Guotai Wang, Hai Su, Hamid Tizhoosh, Hannes Nickisch, **Hans**

Meine, Hansang Lee, Hao Chen, Haomin Chen, Harini Veeraraghavan, Harshita Sharma, Hayato Itoh, henkjan huisman, Henning Höfener, Heung-Il Suk, Hoda Sadat Hashemi, **Hoel Kervadec***, Hongwei Li, Hongzhi Wang, **Hugo Kuijf**, Hui Qu, Ilker Hacihaliloglu, Iman Aganj, Imtiaz Ziko, Ingerid Reinertsen, Blas Pagador, Jérôme Rony, **Jannis Hagenah**, Jeff Craley, Jelmer Wolterink, Jian Sun, Jianming Liang, Jiawen Yao, Jie Yang, Jie Zhang, John-Melle Bokhorst, John Onofrey, Jon Haitz Legarreta, Jonas Richiardi, Jonas Teuwen, Jonghye Woo, José Orlando, Juntang Zhuang, Justin Haldar, Kaleem Siddiqi, Karthik Gopinath, kayhan Batmanghelich, Keelin Murphy, **Kersten Petersen**, Kevin Mader, Kilian Pohl, Kivanc Kose, Klaus Eickel, Klaus Maier-Hein, Laurent Risser, Lei Xiang, Lilla Zollei, Linwei Wang, Lipeng Ning, Loic Le Folgoc, Long Xie, Manning Wang, Maria A. Zuluaga, **Markus Wenzel**, **Martin Styner**, Marvin Lerousseau, Mathilde Bateson, Matthew Sinclair, Matthew Toews, Matthias Günther, **Melanie Ganz**, Michela Antonelli, Mihir Sahasrabudhe, Mingchen Gao, Minjeong Kim, Mohammad Havaei, Mohammad Sabokrou, Mohammadhadi Khorrami, **Murat Ayhan***, Namkug Kim, Neerav Karani, Nicha Dvornek, **Nick Pawlowski**, Nicolas Duchateau, Niha Beig, Niharika Dsouza, Nikolas Lessmann, Ninnon Burgos, Panagiotis Korfiatis, Patrick Leo, **Pedro Gordaliza**, Pieter Vos, Pietro Gori, Prashna Gyawali, Qicheng Lao, Qingyu Zhao, Rabia Haq, Raghav Mehta, Raghavendra Selvan, Raphael Prevost, René Werner, Reuben Dorent, Roberto Souza, Rodney LaLonde, Ruizhi Liao, Saad Nadeem, Sandesh Ghimire, Sara Moccia, Sarah Gerard, Sarfaraz Hussein, Satish Viswanath, **Saypraseuth Mounsaveng***, Seong Jae Hwang, Seyed Mostafa Kia, Shadi Albarqouni, Shantanu Joshi, Shekoofeh Azizi, Sheng Wang, Shireen Elhabian, Silas Ørting, stamatia Giannarou, **Stefan Klein**, Stefan Sommer, Stephen Mckenna, Stergios Christodoulidis, Suhang You, Talha Qaiser, Tamas Ungi, **Tanja Lossau***, Théo Estienne, **Theo van Walsum**, Thomas van den Heuvel, Tian Xia, Ujjwal Verma, **Ulas Bagci**, Vamsi Ithapu, **Vincent Andrearczyk**, Vincent Jaouen, Weidi Xie, Wenqi Li, **Xiahai Zhuang**, Xiang Jiang, xiangxue wang, Xiaoning Qian, Xiaoran Chen, Xiaoxiao Li, Xiaoyi Jiang, Xin Yi, Yanning Zhou, Yixuan Yuan, Yizhe Zhang, Yoonmi Hong, **Young-Gon Kim**, Yuankai Huo, Yueming Jin, Yunliang Cai, Zaneta Swiderska-Chadaaj, Zenglin Xu, Zhangyang Wang, Ziga Spiclin.