Acknowledgments

This book would not have been possible without the contributions of many people.

We would like to thank those who commented on our proposal for the book and helped plan its contents and organization: Guillaume Alain, Kyunghyun Cho, Çağlar Gülçehre, David Krueger, Hugo Larochelle, Razvan Pascanu and Thomas Rohée.

We would like to thank the people who offered feedback on the content of the book itself. Some offered feedback on many chapters: Martín Abadi, Guillaume Alain, Ion Androutsopoulos, Fred Bertsch, Olexa Bilaniuk, Ufuk Can Biçici, Matko Bošnjak, John Boersma, Greg Brockman, Alexandre de Brébisson, Pierre Luc Carrier, Sarath Chandar, Pawel Chilinski, Mark Daoust, Oleg Dashevskii, Laurent Dinh, Stephan Dreseitl, Jim Fan, Miao Fan, Meire Fortunato, Frédéric Francis, Nando de Freitas, Çağlar Gülçehre, Jurgen Van Gael, Javier Alonso García, Jonathan Hunt, Gopi Jeyaram, Chingiz Kabytayev, Lukasz Kaiser, Varun Kanade, Asifullah Khan, Akiel Khan, John King, Diederik P. Kingma, Yann LeCun, Rudolf Mathey, Matías Mattamala, Abhinav Maurya, Kevin Murphy, Oleg Mürk, Roman Novak, Augustus Q. Odena, Simon Pavlik, Karl Pichotta, Eddie Pierce, Kari Pulli, Roussel Rahman, Tapani Raiko, Anurag Ranjan, Johannes Roith, Mihaela Rosca, Halis Sak, César Salgado, Grigory Sapunov, Yoshinori Sasaki, Mike Schuster, Julian Serban, Nir Shabat, Ken Shirriff, Andre Simpelo, Scott Stanley, David Sussillo, Ilya Sutskever, Carles Gelada Sáez, Graham Taylor, Valentin Tolmer, Massimiliano Tomassoli, An Tran, Shubhendu Trivedi, Alexey Umnov, Vincent Vanhoucke, Marco Visentini-Scarzanella, Martin Vita, David Warde-Farley, Dustin Webb, Kelvin Xu, Wei Xue, Ke Yang, Li Yao, Zygmunt Zając and Ozan Çağlayan.

We would also like to thank those who provided us with useful feedback on individual chapters:

- Notation: Zhang Yuanhang.
- Chapter 1, Introduction: Yusuf Akgul, Sebastien Bratieres, Samira Ebrahimi,

Charlie Gorichanaz, Brendan Loudermilk, Eric Morris, Cosmin Pârvulescu and Alfredo Solano.

- Chapter 2, Linear Algebra: Amjad Almahairi, Nikola Banić, Kevin Bennett, Philippe Castonguay, Oscar Chang, Eric Fosler-Lussier, Andrey Khalyavin, Sergey Oreshkov, István Petrás, Dennis Prangle, Thomas Rohée, Gitanjali Gulve Sehgal, Colby Toland, Alessandro Vitale and Bob Welland.

- Chapter 3, Probability and Information Theory: John Philip Anderson, Kai Arulkumaran, Vincent Dumoulin, Rui Fa, Stephan Gouws, Artem Oboturov, Antti Rasmus, Alexey Surkov and Volker Tresp.

- Chapter 4, Numerical Computation: Tran Lam AnIan Fischer and Hu Yuhuang.

- Chapter 5, Machine Learning Basics: Dzmitry Bahdanau, Justin Domingue, Nikhil Garg, Makoto Otsuka, Bob Pepin, Philip Popien, Emmanuel Rayner, Peter Shepard, Kee-Bong Song, Zheng Sun and Andy Wu.

- Chapter 6, Deep Feedforward Networks: Uriel Berdugo, Fabrizio Bottarel, Elizabeth Burl, Ishan Durugkar, Jeff Hlywa, Jong Wook Kim, David Krueger and Aditya Kumar Praharaj.

- Chapter 7, Regularization for Deep Learning: Morten Kolbæk, Kshitij Lauria, Inkyu Lee, Sunil Mohan, Hai Phong Phan and Joshua Salisbury.

- Chapter 8, Optimization for Training Deep Models: Marcel Ackermann, Peter Armitage, Rowel Atienza, Andrew Brock, Tegan Maharaj, James Martens, Kashif Rasul, Klaus Strobl and Nicholas Turner.

- Chapter 9, Convolutional Networks: Martín Arjovsky, Eugene Brevdo, Konstantin Divilov, Eric Jensen, Mehdi Mirza, Alex Paino, Marjorie Sayer, Ryan Stout and Wentao Wu.

- Chapter 10, Sequence Modeling: Recurrent and Recursive Nets: Gökçen Eraslan, Steven Hickson, Razvan Pascanu, Lorenzo von Ritter, Rui Rodrigues, Dmitriy Serdyuk, Dongyu Shi and Kaiyu Yang.

- Chapter 11, Practical Methodology: Daniel Beckstein.

- Chapter 12, Applications: George Dahl, Vladimir Nekrasov and Ribana Roscher.

- Chapter 13, Linear Factor Models: Jayanth Koushik.

- Chapter 15, Representation Learning: Kunal Ghosh.
- Chapter 16, Structured Probabilistic Models for Deep Learning: Minh Lê and Anton Varfolom.
- Chapter 18, Confronting the Partition Function: Sam Bowman.
- Chapter 19, Approximate Inference: Yujia Bao.
- Chapter 20, Deep Generative Models: Nicolas Chapados, Daniel Galvez, Wenming Ma, Fady Medhat, Shakir Mohamed and Grégoire Montavon.
- Bibliography: Lukas Michelbacher and Leslie N. Smith.

We also want to thank those who allowed us to reproduce images, figures or data from their publications. We indicate their contributions in the figure captions throughout the text.

We would like to thank Lu Wang for writing pdf2htmlEX, which we used to make the web version of the book, and for offering support to improve the quality of the resulting HTML.

We would like to thank Ian's wife Daniela Flori Goodfellow for patiently supporting Ian during the writing of the book as well as for help with proofreading.

We would like to thank the Google Brain team for providing an intellectual environment where Ian could devote a tremendous amount of time to writing this book and receive feedback and guidance from colleagues. We would especially like to thank Ian's former manager, Greg Corrado, and his current manager, Samy Bengio, for their support of this project. Finally, we would like to thank Geoffrey Hinton for encouragement when writing was difficult.