

Nicolas Chapados

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 Nicolas Chapados

Education

Academic Degrees

- 2009 **Ph.D.** Computer Science, *Université de Montréal*, Montréal, Canada.
Thesis title: “Sequential Machine Learning Approaches for Portfolio Management”. Distinction: amongst the top-5% of the University’s theses. Advisor: Prof. Yoshua Bengio.
- 2000 **M.Sc.** Computer Science, *Université de Montréal*, Montréal, Canada.
Investigated the use of neural networks in financial asset allocation to optimize investment performance in a value-at-risk setting. Advisor: Prof. Yoshua Bengio.
- 1995 **B.Eng.** Computer Engineering, *McGill University*, Montréal, Canada.

Professional Titles

- 2010 **Chartered Financial Analyst**, *CFA Institute*, Charlottesville, VA, USA.

Professional Experience

- 2025– **Co-founder and Chief Scientist**, *Nera Software Inc.*, Montréal, Canada.
Nera is a startup founded in 2025 building the system of record for verified intent in software and digital assets.
- 2021–2025 **Vice-President, Research**, *ServiceNow Inc.*, Santa Clara, CA.
Led a 50-strong AI team of fundamental and applied researchers, focused on advancing enterprise AI and enabling technology transfer within ServiceNow. ServiceNow (*NYSE:NOW*) is a leading enterprise digital workflow company, with over 22,000 employees globally and some 10,000 customers.
- 2016–2020 **Co-founder and Chief Science Officer**, *Element AI Inc.*, Montréal, Canada.
Element AI helped organizations operationalize artificial intelligence for better decision-making. *Acquisition by ServiceNow announced on 2020-11-30.*
- 2014–2022 **Co-founder and Special Executive Advisor on AI**, *Imagia Inc.*, Montréal, Canada.
Imagia delivered detection, classification, segmentation and follow-up of cancer tumors on medical images using state-of-the-art deep learning algorithms. *In 2022, Imagia merged with Canexia Inc. to become Imagia Canexia Health, a company focused on precision oncology diagnostic devices and software. The company’s assets are now deployed by Avitia.*
- 2012– **Co-founder, Partner**, *Chapados Couture Capital Inc.*, Montréal, Canada.
Chapados Couture Capital is a private holding company and was, until 2025, an alternative asset management firm registered with AMF, Québec’s securities regulator. I carry out research on the quantitative and machine learning trading strategies at the core of the firm’s operations.

2001– **Co-founder and president**, *ApSTAT Technologies Inc.*, Montréal, Canada.

ApSTAT specializes in statistical modeling and machine learning for the medical, financial and business forecasting sectors. The firm was co-founded by four academics and maintains a strong spirit of university–industry collaboration. My mandates have included:

- **Senior Researcher** (Biodesix, 2013–2014): investigated deep learning techniques to improve cancer diagnosis test accuracy at the heart of Biodesix’ products.
- **Senior Advisor, Machine Learning Research** (JDA Software, 2012–2017): carrying out research for improving time series forecasting accuracy within one of the world’s leading supply chain demand forecasting software suites.
- **Data Mining Consultant** (RONA & CGI, 2012): laid out RONA’s corporate vision for incorporating market basket analysis techniques within the company’s operations.
- **Architect and Project Manager** (Planora, 2004–2012): designed and led the development team of the forecasting engine within Planora’s workforce optimization software.
- **Senior Researcher and Project Manager** (US DoD Army Research Laboratory, 2007–2010): led the research team to investigate machine learning algorithms to classify noisy impulsive audio signals in a context of high class imbalance.
- **Lead Researcher** (Desjardins Global Asset Management, 2003–2008): Carried out research to apply statistical learning algorithms to portfolio management, including forecasting models for commodities markets as well as stock-ranking models jointly using accounting, technical and fundamental signals. Developed trading strategies and co-managed a commodities hedge fund administered by DGAM.

Since 2017, ApSTAT Technologies has ceased operational activities to become a holding company with positions in enterprises best positioned to leverage artificial intelligence technology in various economically-relevant verticals. It also directly invests in strategic opportunities.

1995–1999 **Member of the scientific staff**, *Nortel Networks Ltd. (formerly Bell-Northern Research)*, Montréal, Canada.

Carried out the initial research, and then designed, implemented and documented the discourse manager system in a next-generation continuous-speech natural-language application. Previously, led the development of a reusable library of C++ components for speech recognition and statistical modeling. Advisor to the speech group on object-oriented design and C++ programming style. (Full-time employee, 1995–97; consultant 1997–99.)

1990–1995 **Project leader & PC principal developer**, *ReadySoft Inc.*, Montréal, Canada.

Designed the software and led the programming team of the IBM PC (MS DOS) version of the video game *Wrath of the Demon*TM. This game was given superb reviews by leading game magazines; PC Entertainment (Jan. 1992) said: “Combine superior play qualities with outstanding graphics, animation and music, and there’s no question that *Wrath of the Demon* is a handsdown winner.”

Appointments

2023– **Associate Industry Member**, *Mila – Québec Artificial Intelligence Institute*, Montréal, Canada.

2014– **Adjunct Professor**, Applied Mathematics, *École Polytechnique de Montréal*, Montréal, Canada.

2015–2020 **Adjunct Professor**, Computer Science, *University of Sherbrooke*, Sherbrooke, Canada.

Patents

- U.S. patent 12,406,173 *Covariate processing with neural network execution blocks*. Inventors: Daniel Wong, Dmitri Carpov, Nicolas Chapados. Filed 2020-10-30 (Element AI), awarded 2025-09-02 (assignee: ServiceNow). Canadian patent 3,097,644 awarded 2023-10-03; PCT publication WO 2022/087745.
- U.S. patent 12,165,090 *Method and system of demand forecasting for inventory management of slow-moving inventory in a supply chain*. Inventor: Nicolas Chapados. Awarded 2024-12-10 (assignee: Blue Yonder); continuation of U.S. patent 11,403,573 below. A further continuation, application 18/943,270, is pending (published 2025-02-27 as US 2025/0069006).
- U.S. patent 11,403,573 *Method and system of demand forecasting for inventory management of slow-moving inventory in a supply chain*. Inventor: Nicolas Chapados. Filed 2015-06-03 (JDA Software), awarded 2022-08-02.
- U.S. patent 11,144,785 *Method and system for processing a task with robustness to missing input information*. Inventors: Nicolas Chapados, Nicolas Guizard, Mohammad Havaei, Yoshua Bengio. Filed 2017-03-17 (Imagia), awarded 2021-10-12. Canadian patent 3,017,697 awarded 2021-01-26; PCT publication WO 2017/158575.
- Canadian patent 3,105,533 *Method and system for generating synthetically anonymized data for a given task*. Inventors: Florent Chandelier, Andrew Jesson, Lisa Di Jorio, Cécile Low-Kam, Florian Soudan, Mohammad Havaei, Nicolas Chapados. Filed 2019-07-12 (Imagia), awarded 2023-08-22. PCT publication WO 2020/012439; U.S. and European applications (US 2021/0232705, EP 3821361) not pursued.
- U.S. patent 6,356,869 *Method and apparatus for discourse management*. Inventors: Nicolas Chapados, Peter Stuble, Claudia Pateras, Réal Tremblay. Filed 1999-04-30 (Nortel Networks), awarded 2002-03-12, expired 2019. **Cited by 217 patent documents** (Google Patents, 2026-09-05).
- Patent application *Trading schedule management system*. Inventors: Pascal Bergeron, Nicolas Chapados, Étienne Marcotte, Marek Sabata, Ivan Sergienko, Richard Anthony Valenzano, Benjamin Crestel. PCT application filed 2019-09-13 (Element AI), published as WO 2020/051712; Canadian application 3,112,484 pending. U.S. and European applications (US 2022/0027990, EP 3850578) not pursued.
- Provisional application *A System and Method of Online Ratings Trends for Demand Forecast*. Inventors: Philippe Jean-Marc Tilly, Nicolas Chapados, Marie-Claude Côté. U.S. provisional application filed October 2015 (JDA Software).

Technical Skills and Interests

Computer-Related

- **Modeling environments:** PyTorch, R, Mathematica, Matlab, Excel.
- **Expertise** in C++, Python, Prolog, Intel 80x86 assembly.
- Excellent knowledge of CUDA, C#, Java, Perl, Common Lisp, VHDL, Fortran.
- **Programming** for Unix/Linux, Windows, Docker, Web technologies (HTML, CSS, JavaScript, JQuery), Databases (SQL, MS SQL Server, MongoDB).

Technical and Engineering

Machine learning algorithms (deep neural networks, Gaussian processes, support vector machines, decision trees, probabilistic graphical models), data mining (clustering, basket analysis, recommender systems, text mining), time series analysis, speech recognition (HMMs), natural language processing, classical AI (planning, reasoning), digital signal processing.

Finance

Portfolio management (single and multiperiod models), derivatives, robust forecasting of asset returns, covariance modeling, Bayesian approaches, CFA curriculum.

Human Languages

Spoken and written: French, English. Elementary Spanish.

Invited Talks

- August 2025 IJCAI 2025 Workshop on Artificial Intelligence for Time Series Analysis (AI4TS), Montréal, Canada. Keynote: “Context is Key: A Benchmark for Forecasting with Essential Textual Information.”
- July 2025 ACL 2025 Workshop for Research on Agent Language Models (REALM), Vienna, Austria. Keynote: “Agentic Full-Stack Benchmarking for Knowledge Work.”
- October 2024 UC Berkeley, CS294/194-196 *Large Language Model Agents* (course and MOOC). Guest lecture, with Alexandre Drouin: “AI Agents for Enterprise Workflows.” Recording: youtube.com/live/-yf-e-9FvOc.
- October 2022 Bank of Canada, Workshop on Deep Learning for Economic Forecasting. “Deep Learning for Time Series Forecasting: N-BEATS and TACTiS.”
- February 2022 Gojek-Tokopedia (Indonesia/Singapore), Data Science Summit. “Beyond Correlation Machines: Causality Tools for Better Predictions and Decisions at Scale.”
- December 2020 Dong-A Business Forum (Seoul, Korea). “AI for Climate Change & Rebuilding after Covid-19”
- November 2019 Monetary Authority of Singapore and Veritas Consortium *Expert Series*. “Raising AI Standards of Practice with Explainability.”
- June 2019 International Society for Consumer Psychology, Annual Conference. “Modeling Behavior at Scale: Techniques from Machine Learning and Causal Inference.”
- June 2018 Singapore Defence Technology Summit. “Realizing the Potential of Autonomous Systems.”
- January 2018 Technology Applied to Securities Markets Enforcement (TASMEC), 1st International Conference. “Artificial Intelligence Applications in Securities Markets Enforcement.”
- May 2017 Tutte Institute for Mathematics and Computing, Canadian Security Establishment, Ottawa, Canada. “Neural Networks: from function approximators to trainable Turing machines”
- March 2017 Journée de l’assurance de dommages, Montréal, Canada. “Intelligence artificielle: Conséquences pour l’industrie de l’assurance.”

- February 2017 AQT CEO Vision, Mont-Tremblant, Canada. “AI in Business.”
- October 2016 CIFAR Workshop on Deep Learning for Medical Imaging, Amsterdam, Netherlands. “HeMIS: Hetero-Modal Image Segmentation.”
- September 2016 Power Corporation and AMF joint meeting on FinTech regulation, Montréal, Canada. “AI in FinTech: What’s New? What’s in the Future?”
- July 2016 Next 36 Venture Night, Toronto, Canada. “Artificial Intelligence, Deep Learning, and all that. What’s New? Why the Excitement?”
- October 2015 Workshop on healthcare decision systems, Ste-Justine Hospital, Montréal, Canada. “Introduction to machine learning for healthcare.”
- July 2015 ICML Demand Forecasting Workshop, Lille, France. “Effective Bayesian Modeling of Groups of Related Count Time Series.”
- November 2014 University of Montréal, Montréal, Canada. “Effective Bayesian Modeling of Groups of Related Count Time Series.”
- October 2014 École Polytechnique de Montréal, Montréal, Canada. “Le Big Data – y voir clair.”
- July 2014 University of Sherbrooke, Sherbrooke, Canada. “Effective Bayesian Modeling of Groups of Related Count Time Series.”
- May 2014 Google Machine Learning Research Group, Mountain View, CA, USA. “Bayesian Modeling of Groups of Related Count Time Series.”
- March 2014 OPTSUM 2014, Hyderabad, India. “Deep Learning: What, Why, How?”
- March 2014 OPTSUM 2014, Hyderabad, India. “Time Series Forecasting with State Space Models.”

Professional Service and Volunteer Activities

- Co-advisor
- Ph.D. thesis of Andrew Williams, University of Montréal, 2024–.
 - Ph.D. thesis of Amine El Attami, École Polytechnique de Montréal, 2023–.
 - Ph.D. thesis of Peyman Kafaei, École Polytechnique de Montréal, 2018–22.
 - Ph.D. thesis of Ahmad Maaref, École Polytechnique de Montréal, 2018–19.
 - M.Sc. thesis of Adam Salvail, University of Sherbrooke, 2015–2020.
- External Examiner
- Ph.D. thesis of Roberto Aldave entitled “Systematic Ensemble Learning And Extensions For Regression”, University of Sherbrooke, 2014.
- Associate
- Creative Destruction Lab, AI cohort, HEC Montréal, 2017–2018, 2022–2026.
 - Creative Destruction Lab, Fintech cohort, Oxford University Saïd School of Business, 2021–2024.
 - Creative Destruction Lab, Supply Chain Cohort, HEC Montréal, 2019–21.
 - Creative Destruction Lab, Machine Learning cohort, Rotman School of Management, University of Toronto, 2016–2019.

- Committee and Board Memberships
- *Member of the startup committee*, Mila – Québec Artificial Intelligence Institute, 2020–2025.
 - *Member of the board of directors*, Institut de la technologie pour l’humain, 2019–.
 - *Member of the scientific committee*, IVADO (Institut de valorisation des données; U. of Montréal, École Polytechnique, HEC Montréal), 2017–.
 - *Member of the technology transfer committee*, IVADO (Institut de valorisation des données; U. of Montréal, École Polytechnique, HEC Montréal), 2017–2018.
 - *Interdisciplinary working group on high-frequency trading*, Commission de l’éthique en science et en technologie, Ministère de l’économie, de l’innovation et des exportations du Québec, 2014–2015.
 - *Member of the board of directors*, Association des diplômés en informatique et recherche opérationnelle de l’Université de Montréal, 2013–2021.
- Referee
- Journals: Journal of Machine Learning Research, Quantitative Finance, INFORMS Journal on Computing
 - Conferences: International Conference on Machine Learning (ICML), Neural Information Processing Systems (NeurIPS), International Conference on Learning Representations (ICLR)

Publications

Books and Book Chapters

- [1] Richard Zuroff and **Nicolas Chapados**. *Artificial Intelligence in Finance: Challenges, Opportunities and Regulatory Developments*, chapter Explaining Explainable AI, pages 19–59. Edward Elgar Publishing, April 2023. ISBN 978-1803926162.
- [2] Mohammad Havaei, Nicolas Guizard, **Nicolas Chapados**, and Yoshua Bengio. *Signal Processing and Machine Learning for Biomedical Big Data*, chapter Information Fusion in Deep Convolutional Neural Networks for Biomedical Image Segmentation. CRC Press, 2018. ISBN 978-1498773454.
- [3] **Nicolas Chapados**. *Portfolio Choice Problems: an Introductory Survey of Single and Multiperiod Models*. Springer, 2011. ISBN 978-1-4614-0576-4.
- [4] **Nicolas Chapados**. *Algorithmes d’apprentissage en gestion de portefeuille: optimisation et combinaison de réseaux de neurones; application à la répartition d’actifs sous contrainte de valeur à risque*. Éditions Universitaires Européennes, 2010. ISBN 978-6131534096.
- [5] Charles Dugas, Yoshua Bengio, **Nicolas Chapados**, Pascal Vincent, Germain Denoncourt, and Christian Fournier. Statistical learning algorithms applied to automobile insurance ratemaking. In L. Jain and A.F. Shapiro, editors, *Intelligent Techniques for The Insurance Industry: Theory and Applications*. World Scientific, 2003. ISBN 978-9812387189.

Refereed Journal Articles

- [6] Arjun Ashok, Andrew Robert Williams, Vincent Zhihao Zheng, Irina Rish, **Nicolas Chapados**, Étienne Marcotte, Valentina Zantedeschi, and Alexandre Drouin. Beyond naïve prompting: Strategies for improved context-aided forecasting with

LLMs. *Transactions on Machine Learning Research*, July 2026. Preprint: arXiv:2508.09904.

- [7] Thibault Le Sellier de Chezelles, Maxime Gasse, Alexandre Drouin, Massimo Caccia, Léo Boisvert, Megh Thakkar, Tom Marty, Rim Assouel, Sahar Omid Shayegan, Lawrence Keunho Jang, Xing Han Lù, Ori Yoran, Dehan Kong, Frank F. Xu, Siva Reddy, Quentin Cappart, Graham Neubig, Ruslan Salakhutdinov, **Nicolas Chapados**, and Alexandre Lacoste. The BrowserGym ecosystem for web agent research. *Transactions on Machine Learning Research*, 2025. Preprint: arXiv:2412.05467.
- [8] Amine El Hattami, **Nicolas Chapados**, and Christopher Pal. Spaced scheduling for large language model training. *Transactions on Machine Learning Research*, 2025.
- [9] Peyman Kafei, Quentin Cappart, **Nicolas Chapados**, Hamed Pouya, and Louis-Martin Rousseau. Dynamic routing and wavelength assignment with reinforcement learning. *INFORMS Journal on Optimization*, 6(1):1–18, 2024. Winter 2024 issue; published online 8 June 2023.
- [10] Peyman Kafei, Quentin Cappart, Marc-Andre Renaud, **Nicolas Chapados**, and Louis-Martin Rousseau. Graph neural networks and deep reinforcement learning for simultaneous beam orientation and trajectory optimization of cyberknife. *Physics in Medicine & Biology*, 66(21):215002, oct 2021.
- [11] Michael F Byrne, **Nicolas Chapados**, Florian Soudan, Clemens Oertel, Milagros Linares Pérez, Raymond Kelly, Nadeem Iqbal, Florent Chandelier, and Douglas K Rex. Real-time differentiation of adenomatous and hyperplastic diminutive colorectal polyps during analysis of unaltered videos of standard colonoscopy using a deep learning model. *Gut*, 68(1):94–100, January 2019. Published online 24 October 2017.
- [12] **Nicolas Chapados**, Marc Joliveau, Pierre L’Ecuyer, and Louis-Martin Rousseau. Retail store scheduling for profit. *European Journal of Operational Research*, 239(3):609–624, 2014.
- [13] Yoshua Bengio, **Nicolas Chapados**, Olivier Delalleau, Christian Hudon, Xavier Saint-Mleux, Hugo Larochelle, and Jérôme Louradour. Detonation classification from acoustic signature with the Restricted Boltzmann Machine. *Computational Intelligence*, 28(2):261–288, May 2012.
- [14] Charles Dugas, **Nicolas Chapados**, Réjean Ducharme, Xavier Saint-Mleux, and Pascal Vincent. A high-order feature synthesis and selection algorithm applied to insurance risk modelling. *International Journal of Business Intelligence and Data Mining*, 6(3):237–258, 2011.
- [15] **Nicolas Chapados** and Yoshua Bengio. Noisy k best-paths for approximate dynamic programming with application to portfolio optimization. *Journal of Computers*, 2(1):12–19, February 2007.

- [16] Yoshua Bengio and **Nicolas Chapados**. Extensions to metric-based model selection. *Journal of Machine Learning Research*, 3:1209–1227, March 2003.
- [17] **Nicolas Chapados** and Yoshua Bengio. Cost functions and model combination for VaR-based asset allocation using neural networks. *IEEE Transactions on Neural Networks*, 12:890–906, July 2001.

Refereed Conference Proceedings

- [18] Karolina Stańczak, Nicholas Meade, Mehar Bhatia, Hattie Zhou, Konstantin Böttinger, Jeremy Barnes, Jason Stanley, Nicolas Papernot, **Nicolas Chapados**, Denis Therien, Timothy P. Lillicrap, Ana Marasović, Sylvie Delacroix, Gillian K. Hadfield, and Siva Reddy. Societal frameworks can improve LLM alignment. In *Proceedings of the 2026 ACM Conference on Fairness, Accountability, and Transparency (FAccT 2026)*, pages 4491–4510, Montréal, Canada, June 2026. ACM. Preprint: arXiv:2503.00069.
- [19] Léo Boisvert, Abhay Puri, Chandra Kiran Reddy Evuru, Nazanin Mohammadi Sepahvand, **Nicolas Chapados**, Quentin Cappart, Alexandre Lacoste, Krishnamurthy Dvijotham, Alexandre Drouin, and Jason Stanley. Malice in agentland: Down the rabbit hole of backdoors in the AI supply chain. In *Proceedings of the ACM Conference on AI and Agent Systems (CAIS 2026)*, pages 755–772, San Jose, CA, USA, May 2026. ACM. Preprint: arXiv:2510.05159.
- [20] Aarash Feizi, Shravan Nayak, Xiangru Jian, Kevin Qinghong Lin, Kaixin Li, Rabiul Awal, Xing Han Lù, Johan S. Obando-Ceron, Juan A. Rodríguez, **Nicolas Chapados**, David Vázquez, Adriana Romero-Soriano, Reihaneh Rabbany, Perouz Taslakian, Christopher Pal, Spandana Gella, and Sai Rajeswar. Grounding computer use agents on human demonstrations. In *International Conference on Learning Representations (ICLR 2026)*, Rio de Janeiro, Brazil, April 2026. Preprint: arXiv:2511.07332.
- [21] Amirhossein Abaskohi, Tianyi Chen, Miguel Muñoz-Mármol, Curtis Fox, Amrutha Varshini Ramesh, Étienne Marcotte, Xing Han Lù, **Nicolas Chapados**, Spandana Gella, Christopher Pal, Alexandre Drouin, and Issam H. Laradji. DR-Bench: A realistic benchmark for enterprise deep research. In *International Conference on Learning Representations (ICLR 2026)*, Rio de Janeiro, Brazil, April 2026. Preprint: arXiv:2510.00172.
- [22] Parishad BehnamGhader, Vaibhav Adlakha, Fabian David Schmidt, **Nicolas Chapados**, Marius Mosbach, and Siva Reddy. LLM2Vec-Gen: Generative embeddings from large language models. In *Conference on Language Modeling (COLM 2026)*, 2026. Preprint: arXiv:2603.10913.
- [23] Ahmed Masry, Juan A. Rodríguez, Tianyu Zhang, Suyuchen Wang, Chao Wang, Aarash Feizi, Akshay Kalkunte Suresh, Abhay Puri, Xiangru Jian, Pierre-André Noël, Sathwik Tejaswi Madhusudhan, Marco Pedersoli, Bang Liu, **Nicolas Chapados**, Yoshua Bengio, Enamul Hoque, Christopher Pal, Issam Hadj Laradji, David Vázquez, Perouz Taslakian, Spandana Gella, and Sai Rajeswar. AlignVLM: Bridging vision and language latent spaces for multimodal document understanding.

In *Advances in Neural Information Processing Systems 38 (NeurIPS 2025)*, pages 161722–161748, San Diego, CA, USA, December 2025. Preprint: arXiv:2502.01341.

- [24] Shravan Nayak, Xiangru Jian, Kevin Qinghong Lin, Juan A. Rodríguez, Montek Kalsi, **Nicolas Chapados**, M. Tamer Özsu, Aishwarya Agrawal, David Vázquez, Christopher Pal, Perouz Taslakian, Spandana Gella, and Sai Rajeswar. UI-Vision: A desktop-centric GUI benchmark for visual perception and interaction. In *Proceedings of the 42nd International Conference on Machine Learning (ICML 2025)*, volume 267 of *Proceedings of Machine Learning Research*, Vancouver, Canada, July 2025. PMLR. Preprint: arXiv:2503.15661.
- [25] Andrew Robert Williams, Arjun Ashok, Étienne Marcotte, Valentina Zantedeschi, Jithendaraa Subramanian, Roland Riachi, James Requeima, Alexandre Lacoste, Irina Rish, **Nicolas Chapados**, and Alexandre Drouin. Context is key: A benchmark for forecasting with essential textual information. In *Proceedings of the 42nd International Conference on Machine Learning (ICML 2025)*, volume 267 of *Proceedings of Machine Learning Research*, Vancouver, Canada, July 2025. PMLR. Preprint: arXiv:2410.18959.
- [26] Juan A. Rodríguez, Xiangru Jian, Siba Smarak Panigrahi, Tianyu Zhang, Aarash Feizi, Abhay Puri, Akshay Kalkunte, François Savard, Ahmed Masry, Shravan Nayak, Rabiul Awal, Mahsa Massoud, Amirhossein Abaskohi, Zichao Li, Suyuchen Wang, Pierre-André Noël, Mats Leon Richter, Saverio Vadacchino, Shubham Agarwal, Sanket Biswas, Sara Shanian, Ying Zhang, Noah Bolger, Kurt MacDonald, Simon Fauvel, Sathwik Tejaswi, Srinivas Sunkara, João Monteiro, Krishnamurthy Dj Dvijotham, Torsten Scholak, **Nicolas Chapados**, Sepideh Kharagani, Sean Hughes, M. Tamer Özsu, Siva Reddy, Marco Pedersoli, Yoshua Bengio, Christopher Pal, Issam H. Laradji, Spandana Gella, Perouz Taslakian, David Vázquez, and Sai Rajeswar. BigDocs: An open dataset for training multimodal models on document and code tasks. In *International Conference on Learning Representations (ICLR 2025)*, Singapore, April 2025. Preprint: arXiv:2412.04626.
- [27] Gaurav Sahu, Abhay Puri, Juan A. Rodríguez, Amirhossein Abaskohi, Mohammad Chegini, Alexandre Drouin, Perouz Taslakian, Valentina Zantedeschi, Alexandre Lacoste, David Vázquez, **Nicolas Chapados**, Christopher Pal, Sai Rajeswar, and Issam H. Laradji. InsightBench: Evaluating business analytics agents through multi-step insight generation. In *International Conference on Learning Representations (ICLR 2025)*, Singapore, April 2025. Preprint: arXiv:2407.06423.
- [28] Léo Boisvert, Megh Thakkar, Maxime Gasse, Massimo Caccia, Thibault Le Selliér de Chezelles, Quentin Cappart, **Nicolas Chapados**, Alexandre Lacoste, and Alexandre Drouin. WorkArena++: Towards compositional planning and reasoning-based common knowledge work tasks. In *Advances in Neural Information Processing Systems 37 (NeurIPS 2024)*, *Datasets and Benchmarks Track*, pages 5996–6051, Vancouver, Canada, December 2024. Preprint: arXiv:2407.05291.
- [29] João Monteiro, Pierre-André Noël, Étienne Marcotte, Sai Rajeswar, Valentina Zantedeschi, David Vázquez, **Nicolas Chapados**, Christopher Pal, and Perouz Taslakian. RepLiQA: A question-answering dataset for benchmarking LLMs on

- unseen reference content. In *Advances in Neural Information Processing Systems 37 (NeurIPS 2024), Datasets and Benchmarks Track*, pages 24242–24276, Vancouver, Canada, December 2024. Preprint: arXiv:2406.11811.
- [30] João Monteiro, Étienne Marcotte, Pierre-André Noël, Valentina Zantedeschi, David Vázquez, **Nicolas Chapados**, Christopher Pal, and Perouz Taslakian. XC-Cache: Cross-attending to cached context for efficient LLM inference. In *Findings of the Association for Computational Linguistics: EMNLP 2024*, pages 15284–15302, Miami, FL, USA, November 2024. Association for Computational Linguistics. Preprint: arXiv:2404.15420.
 - [31] Alexandre Drouin, Maxime Gasse, Massimo Caccia, Issam H. Laradji, Manuel Del Verme, Tom Marty, David Vázquez, **Nicolas Chapados**, and Alexandre Lacoste. WorkArena: How capable are web agents at solving common knowledge work tasks? In *Proceedings of the 41st International Conference on Machine Learning (ICML 2024)*, volume 235 of *Proceedings of Machine Learning Research*, pages 11642–11662, Vienna, Austria, July 2024. PMLR. Preprint: arXiv:2403.07718.
 - [32] Parishad BehnamGhader, Vaibhav Adlakha, Marius Mosbach, Dzmitry Bahdanau, **Nicolas Chapados**, and Siva Reddy. LLM2Vec: Large language models are secretly powerful text encoders. In *First Conference on Language Modeling (COLM 2024)*, Philadelphia, PA, USA, October 2024. Preprint: arXiv:2404.05961.
 - [33] Arjun Ashok, Étienne Marcotte, Valentina Zantedeschi, **Nicolas Chapados**, and Alexandre Drouin. TACTiS-2: Better, faster, simpler attentional copulas for multivariate time series. In *International Conference on Learning Representations (ICLR 2024)*, Vienna, Austria, May 2024. Preprint: arXiv:2310.01327.
 - [34] Étienne Marcotte, Valentina Zantedeschi, Alexandre Drouin, and **Nicolas Chapados**. Regions of reliability in the evaluation of multivariate probabilistic forecasts. In *Proceedings of the 40th International Conference on Machine Learning (ICML 2023)*, volume 202 of *Proceedings of Machine Learning Research*, pages 23958–24004, Honolulu, HI, USA, July 2023. PMLR. Preprint: arXiv:2304.09836.
 - [35] Alexandre Drouin, Étienne Marcotte, and **Nicolas Chapados**. TACTiS: Transformer-attentional copulas for time series. In Kamalika Chaudhuri, Stefanie Jegelka, Le Song, Csaba Szepesvari, Gang Niu, and Sivan Sabato, editors, *Proceedings of the 39th International Conference on Machine Learning*, volume 162 of *Proceedings of Machine Learning Research*, pages 5447–5493. PMLR, 17–23 Jul 2022.
 - [36] Boris N. Oreshkin, Dmitri Carpov, **Nicolas Chapados**, and Yoshua Bengio. Meta-learning framework with applications to zero-shot time-series forecasting. In *Proceedings of the Thirty-Fifth AAAI Conference on Artificial Intelligence*, pages 9242–9250, 2021.
 - [37] Boris N. Oreshkin, Dmitri Carpov, **Nicolas Chapados**, and Yoshua Bengio. N-BEATS: Neural basis expansion analysis for interpretable time series forecasting. In *International Conference on Learning Representations*, 2020.

- [38] Xiang Jiang, Mohammad Havaei, Farshid Varno, Gabriel Chartrand, **Nicolas Chapados**, and Stan Matwin. Learning to learn with conditional class dependencies. In *International Conference on Learning Representations*, 2019.
- [39] Michael F. Byrne, Florian Soudan, Milagros Henkel, Clemens Oertel, **Nicolas Chapados**, Francisco J. Echagüe, Sina Hamidi Ghalehjagh, Nicolas Guizard, Sébastien Giguère, Margaret E. MacPhail, Andrew Sullivan, Florent Chandelier, and Douglas K. Rex. Real-time artificial intelligence “full colonoscopy workflow” for automatic detection followed by optical biopsy of colorectal polyps. *Gastrointestinal Endoscopy*, 87(6):AB475, June 2018. Abstract Mo1679, Digestive Disease Week 2018, Washington, D.C.
- [40] Andrew Jesson, Nicolas Guizard, Sina Hamidi Ghalehjagh, Damien Goblot, Florian Soudan, and **Nicolas Chapados**. CASED: Curriculum adaptive sampling for extreme data imbalance. In *Medical Image Computing and Computer-Assisted Intervention (MICCAI 2017). Lecture Notes in Computer Science, vol. 10435*, pages 639–646. Springer International Publishing, Cham, 2017.
- [41] Michael F. Byrne, **Nicolas Chapados**, Florian Soudan, Clemens Oertel, Milagros L. Linares Pérez, Raymond Kelly, Nadeem Iqbal, Florent Chandelier, and Douglas K. Rex. Artificial intelligence (AI) in endoscopy—deep learning for optical biopsy of colorectal polyps in real-time on unaltered endoscopic videos. *Gastrointestinal Endoscopy*, 85(5):AB364–AB365, May 2017. Abstract Su1614, Digestive Disease Week 2017, Chicago, IL.
- [42] Michael F. Byrne, Douglas K. Rex, **Nicolas Chapados**, Florian Soudan, Clemens Oertel, Milagros Linares Perez, R. Kelly, N. Iqbal, and Florent Chandelier. Artificial Intelligence (Ai) In Endoscopy–Deep Learning For Optical Biopsy Of Colorectal Polyps In Real-Time On Unaltered Endoscopic Videos. In *United European Gastroenterology Journal*, volume 4, page A155, oct 2016.
- [43] Eugene Vorontsov, Gabriel Chartrand, Olina Dagher, Vi Thuy Tran, Mathieu Flamand, Aline Khatchikian, Amine Smouk, Nicolas Siron, Anne-Catherine Maynard-Paquette, David Roy, **Nicolas Chapados**, Simon Turcotte, Real Lapointe, Franck Vandenbroucke-Menu, Bich Nguyen, Christopher Pal, Samuel Kadoury, and An Tang. Automated Segmentation of Liver Metastases with Deep Convolutional Neural Networks. In *Radiological Society of North America 2016 Scientific Assembly and Annual Meeting*, Chicago, IL, 2016.
- [44] Mohammad Havaei, Nicolas Guizard, **Nicolas Chapados**, and Yoshua Bengio. HeMIS: Hetero-Modal Image Segmentation. In *Medical Image Computing and Computer-Assisted Intervention (MICCAI 2016). Lecture Notes in Computer Science, vol. 9901*, pages 469–477. Springer, Cham, 2016.
- [45] **Nicolas Chapados**. Effective Bayesian modeling of groups of related count time series. In Eric P. Xing and Tony Jebara, editors, *Journal of Machine Learning Research, Workshop and Conference Proceedings*, Volume 32: Proceedings of The 31st International Conference on Machine Learning, pages 1395–1403, Beijing, China, June 2014.

- [46] **Nicolas Chapados**, Marc Joliveau, and Louis-Martin Rousseau. Retail store workforce scheduling by expected operating income maximization. In Tobias Achterberg and J. Christopher Beck, editors, *Integration of AI and OR Techniques in Constraint Programming for Combinatorial Optimization Problems*, Lecture Notes in Computer Science vol. 6697, pages 53–58, Berlin, Germany, 2011. Springer.
- [47] Vincent Mirelli, Stephen Tenney, Yoshua Bengio, **Nicolas Chapados**, and Olivier Delalleau. Statistical machine learning algorithms for target classification from acoustic signature. In *Military Sensors and Systems*, Washington, D.C., August 2009.
- [48] **Nicolas Chapados**, Charles Dugas, Pascal Vincent, and Réjean Ducharme. Scoring models for insurance risk sharing pool optimization. In *Second International Workshop on Domain Driven Data Mining*, Pisa, Italy, December 2008.
- [49] **Nicolas Chapados** and Yoshua Bengio. Augmented functional time series representation and forecasting with Gaussian processes. In J. C. Platt, D. Koller, Y. Singer, and S. T. Roweis, editors, *Advances in Neural Information Processing Systems 20*, pages 265–272, Cambridge, MA, 2008. MIT Press.
- [50] **Nicolas Chapados** and Yoshua Bengio. The k best-paths approach to approximate dynamic programming with application to portfolio optimization. In Luc Lamontagne and Mario Marchand, editors, *Advances in Artificial Intelligence, Proceedings of the 19th Conference of the Canadian Society for Computational Studies of Intelligence*, Lecture Notes in Computer Science Volume 4013, pages 491–502. Springer, 2006.
- [51] Yoshua Bengio and **Nicolas Chapados**. Metric-based model selection for time-series forecasting. In Hervé Bourlard, editor, *Neural Networks for Signal Processing XII*, pages 13–24. IEEE Press, 2002.
- [52] **Nicolas Chapados**, Yoshua Bengio, Pascal Vincent, Charles Dugas, Joumana Ghosn, Ichiro Takeuchi, and Linyan Meng. Estimating car insurance premia: a case study in high-dimensional data inference. In T. G. Dietterich, S. Becker, and Z. Ghahramani, editors, *Advances in Neural Information Processing Systems 14*, pages 1369–1376. MIT Press, 2002.
- [53] **Nicolas Chapados** and Yoshua Bengio. Input decay: Simple and effective soft variable selection. In *Proceedings of the IEEE/INNS International Joint Conference on Neural Networks 2001*, volume 2, pages 1233–1237, July 2001.
- [54] **Nicolas Chapados** and Yoshua Bengio. Cost functions and model combination for VaR-based asset allocation using neural networks. In *Computational Finance 2000*, London, U.K., May 2000.
- [55] Claudia Pateras, **Nicolas Chapados**, Remi Kwan, Dominic Lavoie, and Réal Tremblay. A mixed-initiative natural dialogue system for conference room reservation. In *Proceedings of the EuroSpeech’99 Conference*, volume 3, pages 1275–1278, 1999.

Workshop Presentations

- [56] Amine El Hattami, **Nicolas Chapados**, and Christopher Pal. SKILL.nb: Selective formalization and gated execution for durable agent workflows. In *ICML 2026 Workshop on Failure Modes in Agentic AI (FAGEN)*, Seoul, South Korea, July 2026. Preprint: arXiv:2606.08049.
- [57] Amine El Hattami, Megh Thakkar, **Nicolas Chapados**, and Christopher Pal. WebArena verified: Reliable evaluation for web agents. In *NeurIPS 2025 Workshop on Scaling Environments for Agents (SEA)*, San Diego, CA, USA, December 2025.
- [58] Léo Boisvert, Abhay Puri, Chandra Kiran Reddy Evuru, Joshua Kazdan, Avinandan Bose, Quentin Cappart, Maryam Fazel, Sai Rajeswar, Jason Stanley, **Nicolas Chapados**, Alexandre Drouin, and Krishnamurthy Dj Dvijotham. Silent sabotage: Injecting backdoors into AI agents through fine-tuning. In *ICML 2025 Workshop on Computer Use Agents*, Vancouver, Canada, July 2025.
- [59] Massimo Caccia, Megh Thakkar, Léo Boisvert, Thibault Le Sellier de Chezelles, Alexandre Piché, **Nicolas Chapados**, Alexandre Drouin, Maxime Gasse, and Alexandre Lacoste. Fine-tuning web agents: It works, but it’s trickier than you think. In *NeurIPS 2024 Workshop on Open-World Agents*, Vancouver, Canada, December 2024.
- [60] Kashif Rasul, Arjun Ashok, Andrew Robert Williams, Hena Ghonia, Rishika Bhagwatkar, Arian Khorasani, Mohammad Javad Darvishi Bayazi, George Adamopoulos, Roland Riachi, Nadhir Hassen, Marin Biloš, Sahil Garg, Anderson Schneider, **Nicolas Chapados**, Alexandre Drouin, Valentina Zantedeschi, Yuriy Nevmyvaka, and Irina Rish. Lag-llama: Towards foundation models for probabilistic time series forecasting. In *NeurIPS 2023 Workshop on Robustness of Few-shot and Zero-shot Learning in Large Foundation Models (R0-FoMo)*, New Orleans, LA, USA, December 2023. Preprint: arXiv:2310.08278.
- [61] Rim Assouel, Tom Marty, Massimo Caccia, Issam Laradji, Alexandre Drouin, Sai Rajeswar, Hector Palacios, Quentin Cappart, David Vázquez, **Nicolas Chapados**, Maxime Gasse, and Alexandre Lacoste. The unsolved challenges of LLMs as generalist web agents: A case study. In *NeurIPS 2023 Workshop on Foundation Models for Decision Making*, New Orleans, LA, USA, December 2023.
- [62] Issam Laradji, Perouz Taslakian, Sai Rajeswar, Valentina Zantedeschi, Alexandre Lacoste, **Nicolas Chapados**, David Vázquez, Christopher Pal, and Alexandre Drouin. Capture the flag: Uncovering data insights with large language models. In *NeurIPS 2023 Workshop on Foundation Models for Decision Making*, New Orleans, LA, USA, December 2023. Preprint: arXiv:2312.13876.
- [63] Xiang Jiang, Mohammad Havaei, Gabriel Chartrand, Hassan Chouaib, Thomas Vincent, Andrew Jesson, and **Nicolas Chapados**. Attentive task-agnostic meta-learning for few-shot text classification. In *NeurIPS 2018 Second Workshop on Meta-Learning*, Montréal, Canada, 2018.
- [64] Andrew Jesson, Cécile Low-Kam, Florian Soudan, and **Nicolas Chapados**. Adversarially learned mixture model. In *Theoretical Foundations and Applica-*

tions of Deep Generative Models, ICML 2018, Stockholm, Sweden, July 2018. arXiv:1807.05344.

- [65] Michal Drozdal, Mohammad Havaei, Chin-Way Huang, Laurent Charlin, **Nicolas Chapados**, and Aaron Courville. Data imputation with latent variable models. In *Montreal AI Symposium 2017*, Montréal, Canada, September 2017.
- [66] **Nicolas Chapados** and Pierre L’Ecuyer. Hierarchical Bayesian state-space model for call center arrival rate forecasting. In *Journées de l’optimisation 2014*, Montréal, Canada, May 2014.
- [67] **Nicolas Chapados**, Marc Joliveau, and Louis-Martin Rousseau. Stochastic modeling of retail stores for workforce management. In *2011 INFORMS Simulation Society Research Workshop*, Montréal, Canada, July 2011.
- [68] **Nicolas Chapados** and Christian Dorion. Non-parametric volatility forecasting with Gaussian processes. In *16th International Conference on Computing in Economics and Finance*, London, U.K., July 2010.
- [69] **Nicolas Chapados** and Yoshua Bengio. Forecasting commodity contract spreads with Gaussian processes. In *13th International Conference on Computing in Economics and Finance*, Montréal, Canada, June 2007.
- [70] Pascal Vincent and **Nicolas Chapados**. The PLearn machine learning library. In *NIPS Workshop on Machine Learning Open Source Software*, Whistler, Canada, December 2006.
- [71] **Nicolas Chapados** and Yoshua Bengio. The k -shortest-paths approach to approximate dynamic programming. In *NIPS 2005 Workshop on Machine Learning in Finance*, Whistler, Canada, December 2005. Poster.
- [72] Yoshua Bengio, **Nicolas Chapados**, Charles Dugas, Joumana Ghosn, Ichiro Takeuchi, and Pascal Vincent. High-dimensional data inference for automobile insurance premia estimation. In *2001 MITACS Annual General Meeting*, Montréal, Canada, May 2001.

Theses

- [73] **Nicolas Chapados**. *Sequential Machine Learning Approaches for Portfolio Management*. PhD thesis, Université de Montréal, Montréal, Canada, October 2009.
- [74] **Nicolas Chapados**. *Critères d’optimisation d’algorithmes d’apprentissage en gestion de portefeuille*. Master’s thesis, Université de Montréal, Montréal, Canada, January 2000.

Working Papers and Technical Reports

- [75] Shruthan Radhakrishna, Aman Tiwari, Aanjaneya Shukla, Masoud Hashemi, Rishabh Maheshwary, Shiva Krishna Reddy Malay, Jash Mehta, Pulkit Pattnaik, Saloni Mittal, Khalil Slimi, Kelechi Ogueji, Akintunde Oladipo, Soham Parikh, Oluwanifemi Bamgbose, Toby Liang, Ahmed Masry, Khyati Mahajan, Sai Rajeswar

Mudumba, Vikas Yadav, Sathwik Tejaswi Madhusudhan, Torsten Scholak, Sagar Davasam, Srinivas Sunkara, and **Nicolas Chapados**. Apriel-1.5-15B-Thinker: Mid-training is all you need. ServiceNow SLAM Lab Technical Report, October 2025. Preprint: arXiv:2510.01141.

- [76] Anton Lozhkov, Raymond Li, Loubna Ben Allal, Federico Cassano, Joel Lamy-Poirier, Nouamane Tazi, Ao Tang, Dmytro Pykhtar, Jiawei Liu, Yuxiang Wei, Tianyang Liu, Max Tian, Denis Kocetkov, Arthur Zucker, Younes Belkada, Zijian Wang, Qian Liu, Dmitry Abulkhanov, Indraneil Paul, Zhuang Li, Wen-Ding Li, Megan Risdal, Jia Li, Jian Zhu, Terry Yue Zhuo, Evgenii Zheltonozhskii, Nii Osa Osa Dade, Wenhao Yu, Lucas Krauß, Naman Jain, Yixuan Su, Xuanli He, Manan Dey, Edoardo Abati, Yekun Chai, Niklas Muennighoff, Xiangru Tang, Muhtasham Oblokulov, Christopher Akiki, Marc Marone, Chenghao Mou, Mayank Mishra, Alex Gu, Binyuan Hui, Tri Dao, Armel Zebaze, Olivier Dehaene, Nicolas Patry, Canwen Xu, Julian McAuley, Han Hu, Torsten Scholak, Sebastien Paquet, Jennifer Robinson, Carolyn Jane Anderson, **Nicolas Chapados**, Mostofa Patwary, Nima Tajbakhsh, Yacine Jernite, Carlos Muñoz Ferrandis, Lingming Zhang, Sean Hughes, Thomas Wolf, Arjun Guha, Leandro von Werra, and Harm de Vries. StarCoder 2 and The Stack v2: The next generation. BigCode Project Technical Report, February 2024. Preprint: arXiv:2402.19173.
- [77] **Nicolas Chapados**, Zhenzhen Fan, Ruslan Goyenko, Issam Hadj Laradji, Fred Liu, and Chengyu Zhang. Can AI read the minds of corporate executives? *Preprint, Available at SSRN*, 2023. Preprint: ssrn.com.
- [78] Xiang Jiang, Mohammad Havaei, Gabriel Chartrand, Hassan Chouaib, Thomas Vincent, Andrew Jesson, **Nicolas Chapados**, and Stan Matwin. On the importance of attention in meta-learning for few-shot text classification, 2018. Preprint: arXiv:1806.00852.
- [79] **Nicolas Chapados** and Christian Dorion. Volatility forecasting and explanatory variables: A tractable Bayesian approach to stochastic volatility. Working Paper, May 2013. Preprint: ssrn.com.
- [80] **Nicolas Chapados** and Yoshua Bengio. Forecasting and trading commodity contract spreads with Gaussian processes. Working Paper, 2009. Extended version of the 2007 Computing in Economics and Finance conference paper.
- [81] **Nicolas Chapados** and Yoshua Bengio. Training graphs of learning modules for sequential data. Working Paper, 2009.
- [82] **Nicolas Chapados**. Algorithms and architecture of a soft-ranking system for REITS. ApSTAT Technical Memorandum prepared for Desjardins Global Asset Management, May 2008.
- [83] **Nicolas Chapados**. SAFIR: a simple API for financial information requests. CIRANO Scientific Series 2003s-21, May 2003.
- [84] **Nicolas Chapados**. Comment améliorer la capacité de généralisation des algorithmes d’apprentissage pour la prise de décisions financières. CIRANO Scientific Series 2003s-20, May 2003.

- [85] Olivier Bardou, Yoshua Bengio, **Nicolas Chapados**, and Réjean Ducharme. Valorisation d'options par optimisation du Sharpe ratio. CIRANO Scientific Series 2002s-47, May 2002.
- [86] Yoshua Bengio and **Nicolas Chapados**. Extending metric-based model selection and regularization in the absence of unlabeled data. Université de Montréal, département d'informatique et de recherche opérationnelle, Technical Report #1200, June 2001.
- [87] **Nicolas Chapados**. The design and implementation of Nortel's Discourse Manager. Technical Memorandum, Speech Recognition Research Group, Nortel Networks, 1998.
- [88] **Nicolas Chapados**. Introduction to natural language understanding at Nortel. Technical Memorandum, Speech Recognition Research Group, Nortel Networks, 1998.
- [89] **Nicolas Chapados**. Implementing Maximum A-Posteriori adaptation in OOTP. Technical Memorandum, Speech Recognition Research Group, Nortel Networks, 1997.
- [90] **Nicolas Chapados** and Serge Robillard. Rescoring delay of real-time speech recognition. Technical Memorandum, Speech Recognition Research Group, Nortel Networks, 1997.
- [91] **Nicolas Chapados**. A library of reusable speech recognition components. Technical Memorandum, Speech Recognition Research Group, Nortel Networks, 1996.