

Dr. Helga Ingimundardóttir

Ph.D. in computational engineering

contact

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languages

Icelandic mother tongue

English fluency

Danish conversational

French conversational

programming

all-purpose: C#, C++,

Python

numerical: MATLAB

statistical: R, tidyverse

sql: Microsoft SQL Server,

PostgreSQL

optimisation: GLPK,

Gurobi

scripting: awk, grep, sed,

make

education

2009-16 Ph.D. of Computational Engineering The University of Iceland, Reykjavik
Conducted research on hyperheuristics with guidance from Prof. Tómas Philip Rúnarsson. Focused on automating the scheduling process for Job Shop Scheduling Problems using ordinal regression and analyzed the “problem difficulty” and “algorithm’s footprints in instance space” for such optimization problems. Awarded a doctoral grant from the University of Iceland Research Fund.

Thesis: *ALICE: Analysis & Learning Iterative Consecutive Executions*. Available at <http://hdl.handle.net/1946/25337>.

2010-12 Graduate Diploma of School of Education The University of Iceland, Reykjavik
Teaching Studies for Higher Education.

2008-10 Masters of Computational Engineering The University of Iceland, Reykjavik
Conducted research with Prof. Sylvain Lalot at the University of Valenciennes and Hainaut-Cambresis in Valenciennes, France. Explored the feasibility of using wavelet transforms to detect fouling in cross-flow heat exchangers using measurements obtained during normal operation. Awarded a grant from the Icelandic French Embassy to study in France.

Thesis: *Detection of Fouling: Effectiveness Ratio Method*. Available at <http://hdl.handle.net/1946/4445>.

2005-08 Bachelor of Mathematics The University of Iceland, Reykjavik
Specialization in Computer Science

interests

professional: heuristics, artificial intelligence, evolutionary computation, global optimization, statistical learning, machine learning, big data, automation, data visualization and real world applications

personal: knitting, sewing, general arts and crafts, horticulture, podcasting, internet cats and Russian Blues

academic experience

2023– University of Iceland, Industrial Engineering Department Reykjavik Iceland
Postdoctoral Researcher.

I am currently part of the research team for the Intelligent Decision Learning Models (IDeLM) project, funded by the Rannis Research Fund. The project aims to develop intelligent decision-making models through the application of machine learning and data analytics techniques, with the goal of enhancing decision-making processes in various domains. My responsibilities on the project include conducting research, analyzing data, developing machine learning models, and collaborating with the team to achieve project objectives.

- 2023 **University of Iceland, Industrial Engineering Department** Reykjavik Iceland
Sessional Teacher in Business Intelligence (IDN610M).
As a lecturer for the Business Intelligence course, I taught 3rd year BSc and 1st year MSc students the practical applications of supervised learning, clustering, and process mining using real-world data. My project-driven approach and emphasis on active participation helped students develop practical skills such as effective use of GitHub and technical report writing. By the end of the course, students gained a solid understanding of key machine learning techniques and their use cases, preparing them for success in their future careers.
- 2011-12 **University of Iceland, Industrial Engineering Department** Reykjavik Iceland
Sessional Teacher in Operations Research (IDN401G)
As the sole instructor, I took pride in teaching the undergraduate course on Operations Research during the spring semesters of 2011 and 2012. I worked diligently with Gudrun Geirsdottir at the School of Education to restructure the course, including assignments, grading, and tests.
I am particularly proud of my efforts in innovating the course design, assessment, and evaluations of tutorials, which resulted in inspiring a fellow teacher in Natural Sciences. Together, we were able to secure a teaching grant from the University to further develop our methods, and I was honored to have played a part in that success.
Overall, I am pleased with the work I did in the course and the grant we received, as they are testaments to my dedication to teaching and my ability to think creatively and collaboratively to achieve positive outcomes.
- 2007-10 **University of Iceland, Industrial Engineering Department** Reykjavik Iceland
Teaching Assistant, School of Engineering and Natural Sciences
During my undergraduate studies, I provided tutorial support and correction on student hand-outs for undergraduate courses in Linear Algebra (Autumn 2007), Simulations (Spring 2008), Operational Research (Spring 2008), Calculus IB (Autumn 2009), and Numerical Analysis (Spring 2010) for both Mathematics and Industrial Engineering faculties.

work experience

- 2022-23 **Travelshift** Reykjavik, Iceland
Head of AI research at Travelshift.
As the leader of an AI research team, I developed and implemented data-driven approaches to optimize travel plans for vacation packages offered on GuideToEurope.com. Our project focused on the NP-hard optimization problem of the traveling thief, which combines the concepts of the knapsack problem and the traveling salesman problem. In addition, I worked on patent applications related to our research. I ensured that the optimized travel plans met stakeholders' requirements by designing and implementing AI algorithms, analyzing data, collaborating with other teams, and staying up-to-date with AI research trends and advancements.
- 2021-22 **CCP Games** Reykjavik, Iceland
Data Scientist for CCP Games' data department.
I played a leading role in the development of a recommendation engine service for new characters in EVE Online, working alongside other partners. My responsibilities included creating real-time time-series features based on proto-events from Kafka streams, using the TimescaleDB extension for pgSQL functions for feature engineering. Additionally, I developed ad-hoc metrics to measure content quality and engagement for these new recommendation models.

- 2016-21 **deCODE Genetics** Reykjavik, Iceland
Research Scientist for deCODE's statistical department.
I was a founding member of a dedicated Oxford Nanopore Technologies (ONT) team at deCODE Genetics, responsible for implementing and maintaining the long range sequencing analysis pipeline. In this role, I collaborated closely with the lab department to determine protocols, and worked with the IT department to make necessary changes to cluster and disk architecture to efficiently process a large amount of data (6 petabytes over 3 years), ensuring data integrity. Additionally, I played a key role in writing research papers with the ONT team, and was responsible for operationalizing research findings for use in production environments.
- 2015-16 **AGR Dynamics** Reykjavik, Iceland
SQL Consultant for AGR 5
I provided customized solutions for AGR 5, a web-based supply chain management system that enables users to visualize sales history and generate order proposals using statistical forecasting. My work involved implementing AGR 5 to companies' ERP systems, maintaining databases, and developing custom SQL solutions to meet individual customer needs.
- 2013-15 **Valka** Kopavogur, Iceland
Computational Engineer in Research and Development
As a full-time researcher at Valka, a leading provider of equipment and automation solutions for the fish processing industry, I played a crucial role in several important accomplishments. These include designing and implementing an intelligent fish portioning algorithm based on X-Ray imagery, generalizing the fish bone detection algorithm for multiple species with fast and accurate calculations, collaborating on three-dimensional visualizations of fish bones, and conducting efficiency tests and preparing reports. Through these achievements, I helped to contribute to Valka's success in delivering innovative solutions to the industry.
- 2007-9 **Landsbankinn** Reykjavik, Iceland
Summer Intern at: Testing Department in 2009; Quantitative Research and Trading Support for the FX and Derivatives Sales in 2008; and at Business Support in 2007.

membership in committees and unions

- 2015, Seasonal Advisor for Technology Development Fund Rannsóknamiðstöð Íslands (Rannís)
 2023– I served on the advisory board for grant applications to the Technology Development Fund at Rannís in 2015 and provided valuable insights on the selection of R&D projects for technological development and innovation in Iceland. I resumed my role as an advisor in 2023.
- 2018-21 Board member of Company Union deCODE Genetics
- 2016 Treasurer of Company Union AGR Dynamics
- 2014-15 Treasurer of Company Union Valka
- 2011-12 Science Committee Member SENS, University of Iceland
 Served as a graduate student representative on the Science Committee at the University of Iceland, which aimed to enhance research activities and facilitate discussions on research in different fields of study.
- arg1 Founding member of Arkimedes
 I was a founding member of Arkimedes, the society for PhD students and Postdoctoral researchers at the School of Engineering and Natural Sciences of the University of Iceland.
- 2009-11 Co-founder and Treasurer of Heron SENS, University of Iceland
 As a founder of the Heron Student Union, I merged defunct student organizations into one to represent postgraduate engineering and natural sciences students at the University of Iceland. I served as treasurer, managing finances.
- 2009-10 Treasurer of BEST Reykjavik Board of European Students of Technology (BEST)
 Represented BEST Reykjavik at the BEST General Assembly. Organized two academic courses at the University of Iceland, hosting and entertaining 20 European students for a week.
- 2006-7 President of Stigull SENS, University of Iceland
 Led the undergraduate student organization for Mathematics and Physics at University of Iceland.

communication skills

- 2022 Panelist 3rd European Language Resource Coordination (ELRC) workshop in Iceland
 As a panelist at the third Icelandic ELRC workshop, I discussed the impact of Language Technology and AI on the Icelandic language with other developers, integrators, and users. We explored the potential of Language Technology to transform digital interactions in both private and public sectors and shared our experiences and perspectives on its current status and future prospects. The discussion was engaging and provided valuable insights into the role of Language Technology in shaping our multilingual future.
- 2017-20 Podcast host, ÍSKISUR Alvarpið & Storytel
 I, along with two of my friends, co-hosted an Icelandic podcast where we read all 47 books in The Legend of the Ice People series by Margit Sandemo. Additionally, I curated a segment on Internet cats at the end of each episode. The podcast was originally published by Alvarpið from 2017-18, but was later moved to Storytel Iceland in March 2019.
- 2016-17 Podcast guest, Tæknivarpið Hlaðvarp Kjarnans
 As a frequent guest on Tæknivarpið, an Icelandic podcast dedicated to the newest technology and devices, I had the chance to discuss various topics including the latest iPhones, Star Wars, and gender representation in IT. Through the podcast, I had the opportunity to share my insights and engage in stimulating conversations about the impact of technology on society.
- 2016 Oral Presentation Ph.D. defence 30th of June at Háskóla Íslands, Reykjavík, Iceland.
 Presented my Ph.D. thesis *ALICE: Analysis & Learning Iterative Consecutive Executions*. Opponents: Prof. Edmund Burke and Prof. Kate Smith-Miles.

- 2016 **Founding Workshop** Samtök kvenna í vísindum (SKVÍS)
I was fortunate enough to be a part of the founding workshop of SKVÍS, the Association of Women in Science. The workshop united women from various scientific fields to work towards specific goals aimed at promoting gender equality in science. My role in the workshop involved collaborating with other participants to develop strategies for increasing the visibility of women experts in the media, challenging the prevailing bias towards male experts. Overall, it was an incredibly inspiring and productive event that helped to lay the foundation for SKVÍS as an organization dedicated to supporting women in science.
- 2015 **Oral Presentation** 9th Int'l Conference on Learning and Intelligent Optimization (LION9)
Presented the paper "Generating Training Data for Learning Linear Composite Dispatching Rules for Scheduling" in Lille, France.
- 2012 **Oral Presentation** 6th Int'l Conference on Learning and Intelligent Optimization (LION6)
Presented the paper "Determining the Characteristic of Difficult Job Shop Scheduling Instances for a Heuristic Solution Method" in Paris, France.
- 2011 **Oral Presentation** 11th Int'l Conference on Intelligent Systems Design & Applications (ISDA)
Presented the paper "Sampling Strategies in Ordinal Regression for Surrogate Assisted Evolutionary Optimization" in Cordoba, Spain.
- 2010 **Oral Presentation** 5th Int'l Conference on Learning and Intelligent Optimization (LION5)
Presented the paper "Supervised Learning Linear Priority Dispatch Rules for Job-Shop Scheduling" in Rome, Italy
- 2010 **Invited Speaker** Silisian University, Gliwice, Poland
I was invited by Prof. Waldemar Grzechca to come to Politechnika Śląska in Gliwice, Poland, as part of the Erasmus+ Teaching Staff Mobility Programme. During my stay, I presented my Ph.D. research to the Faculty of Automation, Electronics, and Computer Science.
- 2009 **Poster** 11th Int'l Conference on Heat Exchanger Fouling and Cleaning
Presented the paper "Detection of Fouling in a Cross-Flow Heat Exchanger Using Wavelets" in Schladming, Austria.
- 2009 **Invited Speaker** University of Valenciennes and Hainaut-Cambresis, Valenciennes, France
As part of the collaboration with Sylvan Lalot, I presented the my Masters research to the faculty at the ENSIAME department at UVHC.

grants

- 2012 **Grant for Teaching Development** Univeristy of Iceland, Kennslumálasjóður
Received a grant to improve undergraduate homework assignments in Engineering and Natural Sciences. Worked with the faculties to develop a new, simplified teaching method to reduce the workload for teachers while providing effective feedback for students. Due to work commitments, allowed co-grantee to use the grant to implement the new method.
- 2009-12 **Postgraduate Scholarship** University of Iceland Research Fund
Three year stipend for doctoral studies.
- 2010 **Mobility grant** Fundusz Stypendialny i Szkoleniowy (FSS)
Mobility grant for students and university staff to visit Silisian University, Gliwice, Poland.
- 2009 **Postgraduate Scholarship** French Embassy, Reykjavik Iceland
Awarded to Icelandic students pursuing a Masters degree in France.

awards and nominations

- 2015 **Nominated for Best Paper award** 9th Int'l Conference on Learning and Intelligent Optimization
My paper "Generating Training Data for Learning Linear Composite Dispatching Rules for Scheduling" was one of three full-paper submissions nominated for the Best Paper award.
- 2005 **Magna cum laude** The Commercial College of Iceland, Reykjavik, Iceland
Ranked in the top third of my graduating class and awarded for academic achievement during my final year of a Baccalaureate degree.

publications

Literature available on **Research Gate**

Thesis

ALICE: Analysis & Learning Iterative Consecutive Executions

Helga Ingimundardottir

Ph.D. thesis, p. 265. University of Iceland, 2016, Reykjavik, Iceland.

URL: <http://hdl.handle.net/1946/25337>.

Detection of Fouling: Effectiveness Ratio Method

Helga Ingimundardottir

Master's thesis, p. 94. University of Iceland, 2010, Reykjavik, Iceland.

URL: <http://hdl.handle.net/1946/4445>.

Peer-Reviewed Journal Articles in High-Impact Journals

Long-read sequencing of 3,622 Icelanders provides insight into the role of structural variants in human diseases and other traits

Doruk Beyter, Helga Ingimundardóttir, Asmundur Oddsson, Hannes Eggertsson, Eyþór Björnsson, Hákon Jónsson, Bjarni Atlason, Snædis Kristmundsdóttir, Svenja Mehringer, Marteinn Hardarson, Sigurjon Gudjonsson, Droplaug Magnusdóttir, Aslaug Jonasdóttir, Adalbjorg Jonasdóttir, Ragnar Kristjánsson, Sverrir Sverrisson, Guillaume Holley, Gunnar Palsson, Olafur Stefansson, and Kari Stefansson

In: *Nature Genetics* 53 (May 2021), pp. 779–786. Springer Nature, 2021.

DOI: [10.1038/s41588-021-00865-4](https://doi.org/10.1038/s41588-021-00865-4).

Ratatosk: hybrid error correction of long reads enables accurate variant calling and assembly

Guillaume Holley, Doruk Beyter, Helga Ingimundardóttir, Peter L. Møller, Snædis Kristmundsdóttir, Hannes P. Eggertsson, and Bjarni V. Halldorsson

In: *Genome Biology* 22.1 (Jan. 2021), p. 28. Springer Nature, 2021.

DOI: [10.1186/s13059-020-02244-4](https://doi.org/10.1186/s13059-020-02244-4).

Insights into imprinting from parent-of-origin phased methylomes and transcriptomes

Florian Zink, Droplaug N. Magnusdóttir, Olafur T. Magnusson, Nicolas J. Walker, Tiffany J. Morris, Asgeir Sigurdsson, Gisli H. Halldorsson, Sigurjon A. Gudjonsson, Pall Melsted, Helga Ingimundardóttir, Snædis Kristmundsdóttir, Kristjan F. Alexandersson, Anna Helgadóttir, Julius Gudmundsson, Thorunn Rafnar, Ingileif Jonsdóttir, Hilma Holm, Gudmundur I. Eyjolfsson, Olof Sigurdardóttir, Isleifur Olafsson, Gisli Masson, Daniel F. Gudbjartsson, Unnur Thorsteinsdóttir, Bjarni V. Halldorsson, Simon N. Stacey, and Kari Stefansson

In: *Nature Genetics* 50.11 (Oct. 2018), pp. 1542–1552. Springer Nature, 2018.

DOI: [10.1038/s41588-018-0232-7](https://doi.org/10.1038/s41588-018-0232-7).

Discovering dispatching rules from data using imitation learning: A case study for the job-shop problem

Helga Ingimundardóttir and Thomas Philip Runarsson

In: *Journal of Scheduling* 21.4 (June 2017), pp. 413–428. Springer Nature, 2017.

DOI: 10.1007/s10951-017-0534-0.

Detection of Fouling in a Cross-Flow Heat Exchanger Using Wavelets

Helga Ingimundardottir and Sylvain Lalot

In: *Heat Transfer Engineering* 32.3-4 (Feb. 2011), pp. 349–357. Taylor & Francis, 2011.

DOI: 10.1080/01457632.2010.495668.

Selected SCI Papers for Revised and Extended Publication

Evolutionary Learning of Linear Composite Dispatching Rules for Scheduling

Helga Ingimundardottir and Thomas Philip Runarsson

In: *Computational Intelligence*, ed. by Juan Julian Merelo, Agostinho Rosa, José M. Cadenas, António Dourado, Kurosh Madani, and Joaquim Filipe, pp. 49–62. Springer International Publishing, 2016.

ISBN: 978-3-319-26393-9. DOI: 10.1007/978-3-319-26393-9_4.

Generating Training Data for Learning Linear Composite Dispatching Rules for Scheduling

Helga Ingimundardottir and Thomas Philip Runarsson

In: *Learning and Intelligent Optimization. LION 2015*, ed. by Clarisse Dhaenens, Laetitia Jourdan, and Marie-Éléonore Marmion, pp. 236–248. Springer International Publishing, 2015.

ISBN: 978-3-319-19084-6. DOI: 10.1007/978-3-319-19084-6_22.

Determining the Characteristic of Difficult Job Shop Scheduling Instances for a Heuristic Solution Method

Helga Ingimundardottir and Thomas Philip Runarsson

In: *Learning and Intelligent Optimization. LION 2012*, ed. by Youssef Hamadi and Marc Schoenauer, pp. 408–412. Springer Berlin Heidelberg, 2012.

ISBN: 978-3-642-34413-8. DOI: 10.1007/978-3-642-34413-8_36.

Sampling Strategies in Ordinal Regression for Surrogate Assisted Evolutionary Optimization

Helga Ingimundardottir and Thomas Philip Runarsson

In: *2011 11th International Conference on Intelligent Systems Design and Applications*, pp. 1158–1163. IEEE, 2012.

ISBN: 978-1-4577-1676-8. DOI: 10.1109/ISDA.2011.6121815.

Supervised Learning Linear Priority Dispatch Rules for Job-Shop Scheduling

Helga Ingimundardottir and Thomas Runarsson

In: *Learning and Intelligent Optimization. LION 2011*, ed. by Carlos A. Coello Coello, pp. 263–277. Springer Berlin, 2011.

ISBN: 978-3-642-25565-6. DOI: 10.1007/978-3-642-25566-3_20.

Peer-Reviewed International Conference Proceedings

Generating Training Data for Learning Linear Composite Dispatching Rules for Scheduling

Helga Ingimundardottir and Thomas Philip Runarsson

In: *Proceedings of the 9th International Conference on Learning and Intelligent Optimization – LION9*, ed. by Clarisse Dhaenens, Laetitia Jourdan, and Marie-Éléonore Marmion. 2015.

Evolutionary Learning of Weighted Linear Composite Dispatching Rules for Scheduling

Helga Ingimundardottir. and Thomas Philip Runarsson.

In: *Proceedings of the 6th International Evolutionary Computation Theory and Applications – ECTA6, (IJCCI 2014)*, ed. by Agostinho Rosa, Juan Julian Merelo, and Joaquim Filipe, pp. 59–67. SciTePress, 2014.

ISBN: 978-989-758-052-9. DOI: 10.5220/0005077200590067.

Determining the Characteristic of Difficult Job Shop Scheduling Instances for a Heuristic Solution Method

Helga Ingimundardottir and Thomas Philip Runarsson

In: *Proceedings of the 6th International Conference on Learning and Intelligent Optimization – LION6*, ed. by Marc Schoenauer. 2012.

Sampling Strategies in Ordinal Regression for Surrogate Assisted Evolutionary Optimization

Helga Ingimundardóttir and Thomas Philip Runarsson

In: *Proceedings of the 11th International Conference on Intelligent Systems Design and Applications – ISDA11*. 2011.

Supervised Learning Linear Priority Dispatch Rules for Job-Shop Scheduling

Helga Ingimundardóttir and Thomas Philip Runarsson

In: *Proceedings of the 5th International Conference on Learning and Intelligent Optimization – LION5*, ed. by Carlos A. Coello Coello. 2011.

Detection of Fouling in a Cross-Flow Heat Exchanger Using Wavelets

Helga Ingimundardóttir and Sylvain Lalot

In: *Proceedings of the 8th International Conference on Heat Exchanger Fouling and Cleaning*, ed. by H. Müller-Steinhagen, M.R. Malayeri, and A.P. Watkinson. 2009.

URL: <https://heatexchanger-fouling.com/refereed-proceedings/heat-exchanger-fouling-and-cleaning-viii-2009/>.

Icelandic Articles

Skilningur á röðunarreglum fyrir verkniðurröðun á vélum

Helga Ingimundardóttir

In: *Vélabrógd* vol. 36 (Apr. 2015), pp. 8–11. Þriðja árs véla- og iðnaðarverkfræðinemar við iðnaðarverkfræði-, vélaverkfræði- og tölvunarfræðideild Háskóla Íslands, 2015.

URL: https://issuu.com/velabrogd2016/docs/velabrogd_2015_small.compressed.

Seminars

ALICE: Analysis & Learning Iterative Consecutive Executions

Helga Ingimundardóttir

Statistics and Bioinformatics Seminar at deCODE Genetics, University of Iceland in Dec. 2016

Supervising Learning Linear Composite Dispatch Rules for Scheduling

Helga Ingimundardóttir

ReiDok13 Symposium on Computational PhD Projects at School of Engineering and Natural Sciences, University of Iceland in Apr. 2013

Creating Meaningful Training Data for Difficult JSSP Instances for Ordinal Regression

Helga Ingimundardóttir

Seminar for Ph.D. students at School of Engineering and Natural Sciences, University of Iceland in Mar. 2012

Determining the Characteristic of Difficult JSSP Instances for a Heuristic Solution Methods

Helga Ingimundardóttir

Stats colloquium at School of Engineering and Natural Sciences, University of Iceland in Feb. 2012

Generating Training Data for Learning Linear Composite Dispatching Rules for Scheduling

Helga Ingimundardóttir

ReiDok12 Symposium on Computational PhD Projects at School of Engineering and Natural Sciences, University of Iceland in Dec. 2012

Supervised Learning Linear Priority Dispatch Rules for Job-Shop Scheduling

Helga Ingimundardóttir

Research Symposium, RVoN at School of Engineering and Natural Sciences, University of Iceland in Oct. 2010