

helga ingimundardóttir

computational engineer

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

2009–2016 **Ph.D. of Computational Engineering** The University of Iceland, Reykjavik
During my doctoral studies, I conducted research on hyperheuristics with guidance from Prof. Tomas Philip Runarsson. The focus of my research was on automating the scheduling process for Job Shop Scheduling Problems (JSP) and Flow Shop Problems (FSP) using techniques such as ordinal regression. Additionally, I analyzed the “problem difficulty” and “algorithm’s footprints in instance space.”
thesis: entitled *ALICE: Analysis & Learning Iterative Consecutive Executions* is available at <http://hdl.handle.net/1946/25337>.

2010–2012 **Graduate Diploma of School of Education** The University of Iceland, Reykjavik
Teaching Studies for Higher Education.

2008–2010 **Masters of Computational Engineering** The University of Iceland, Reykjavik
Detection of Fouling: Effectiveness Ratio Method
The dissertation explored the feasibility of using models to detect fouling in cross-flow heat exchangers using measurements obtained during normal operation. A new method that accounts for varying inputs was developed for online fouling detection. The method estimates the steady states of effectiveness using a wavelet transform, which is both time and frequency localized.

2005–2008 **Bachelor of Mathematics** The University of Iceland, Reykjavik
Specialization in Computer Science

interests

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

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

work experience

2022– **Travelshift** Reykjavik, Iceland
Head of AI research at Travelshift.
My primary responsibility is to lead the development and implementation of AI research projects. I am currently leading a team of two AI consultants on a project that involves optimizing travel plans for vacation packages offered on GuideToEurope.com using data-driven approaches. Specifically, we are working on a NP-hard optimization problem referred to as the *traveling thief problem*, which combines the concepts of the knapsack problem and the traveling salesman problem. My research involves ensuring that the optimized travel plans meet the requirements of stakeholders.

- 2021–2022 **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 Redis or 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.
- 2016–2021 **deCODE Genetics** Reykjavik, Iceland
Research Scientist for deCODE's statistical department.
 I implemented and maintained the Oxford Nanopore Technologies long range sequencing analysis pipeline for deCODE. This involved working closely with the lab department to decide on protocols and collaborating with the ITO to make necessary changes to cluster and disk architecture to efficiently process the large amount of data (6 petabytes over 3 years) while ensuring data integrity.
- 2015–2016 **AGR Dynamics** Reykjavik, Iceland
SQL Consultant for AGR 5
 As a SQL consultant for AGR 5, a web-based supply chain management system, I provided customized solutions to meet individual customer needs. Working on the system's back-end, I implemented data and maintained databases. In addition, I developed custom SQL solutions for specific customer requirements. AGR 5 allows users to visualize sales history and generate order proposals using statistical forecasting.
- 2015 **RANNIS** Reykjavik, Iceland
Contractual Advisor in Technology Development Fund
 I served on the advisory board for grant applications to the Technology Development Fund at RANNIS, which supports R&D in technological development for innovation in the Icelandic economy. The fund received a total of 8,580 million ISK in donations from 2004 to 2014, with 1,372.5 million ISK in 2015.
- 2013–2015 **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.

academic experience

- 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.

- 2011–2012 **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.
- 2007–2010 **University of Iceland, Industrial Engineering Department** Reykjavik Iceland
Teaching Assistant (i. dæmatímakennari), School of Engineering and Natural Sciences
 Worked as a tutor during tutorials, correcting and working through handouts for the following under graduate courses:
- Linear Algebra Autumn 2007
 - Simulations Spring 2008
 - Operational Research Spring 2008
 - Calculus IB Autumn 2009
 - Numerical Analysis Spring 2010

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.
- 2017–2020 **Podcast host, ÍSKISUR** Alvarpið & Storytel
 An Icelandic podcast with three friends who read all 47 books in The Legend of the Ice People series by Margit Sandemo. I curated a segment on Internet cats at the end of each episode. Originally published by Alvarpið from 2017–2018 but moved over to Storytel Iceland in March 2019.
- 2016 **Oral Presentation** PhD defence 30th of June at Háskóla Íslands, Reykjavík, Iceland.
 Presented my PhD thesis *ALICE: Analysis & Learning Iterative Consecutive Executions*. Opponents: Prof. Edmund Burke and Prof. Kate Smith-Miles.
- 2015 **Oral Presentation** 9th Int'l Conference on Learning and Intelligent Optimization (LION9)
 Presented the paper *Generating Training Data for Supervised Learning Linear Composite Dispatch Rules for Scheduling*, 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*, Paris, France.

2011	Oral Presentation	11th Int'l Conference on Intelligent Systems Design & Applications (ISDA) Presented the paper <i>Sampling Strategies in Ordinal Regression for Surrogate Assisted Evolutionary Optimization</i> , Cordoba, Spain.
2010	Oral Presentation	5th Int'l Conference on Learning and Intelligent Optimization (LION5) Presented the paper <i>Supervised Learning Linear Priority Dispatch Rules for Job-Shop Scheduling</i> , Rome, Italy
2010	Invited speaker	Silisian University, Gliwice, Poland In collaboration with Prof. Waldemar Grzechca at the Silisian University, I was invited to present my Ph.D. research to their faculty.
2009	Poster	11th Int'l Conference on Heat Exchanger Fouling and Cleaning Presented the paper <i>Detection of Fouling in a Cross-Flow Heat Exchanger Using Wavelets</i> , Schladming, Austria.
2009	Presentation	University of Valenciennes and Hainaut-Cambresis, Valenciennes, France As part of the collaboration with Sylvan Lalot, I presented the research faculty at the ENSIAME department at UVHC.

grants

2012	Grant for Teaching Development	Univeristy of Iceland, Kennslumálasjóður Grant for implementing a new teaching method for tutorials in Engineering and Natural Sciences. Collaboration between Engineering faculty and Natural Sciences faculty.
2009-2012	Postgraduate Scholarship	University of Iceland Research Fund Three year stipend for doctoral studies.
2010	Mobility grant	Fundusz Stypendialny i Szkoleniowy (FSS) Mobility grant to visit Silisian University, Gliwice, Poland.
2009	Postgraduate Scholarship	French Embassy Awarded to Icelandic students pursuing a Masters degree.

extracurricular activity

2018-2021	Board member of Company Union	deCODE Genetics
2016	Treasurer of Company Union	AGR Dynamics
2014-2015	Treasurer of Company Union (Salka)	Valka
2011-2012	Graduate student representative in Science Committee	SENS, UI
2009-2011	Treasurer of Student Union (Heron) for postgraduates	SENS, UI
2011-2012	Graduate student representative in Science Committee	SENS, UI
2009-2010	Treasurer of BEST Reykjavik	Board of European Students of Technology Participated in the BEST General Assembly on behalf of BEST Reykjavik. Helped organize two BEST academic courses at UI, where we housed and entertained 20 European students over a course of a week.
2006-2007	President of Student union (Stigull) for undergraduates in Mathematics and Physics	SENS, UI

awards

- 2015 **Nominated for Best Paper award** 9th Int'l Conference on Learning and Intelligent Optimization
I had one of three full-paper submission nominated for Best Paper award, on my paper *Evolutionary Learning of Weighted Linear Composite Dispatching Rules for Scheduling*.
- 2005 **Magna cum laude** The Commercial College of Iceland, Reykavik, Iceland
Awarded for being the top third student in my final year of a Baccalaureate degree.

publications

Literature available on **Research Gate**

thesis

ALICE: Analysis & Learning Iterative Consecutive Executions

Helga Ingimundardottir

PhD thesis, University of Iceland, 2016, Reykjavik, Iceland

Detection of Fouling: Effectiveness Ratio Method

Helga Ingimundardottir

Master's thesis, University of Iceland, 2011, Reykjavik, Iceland

article in peer-reviewed journals

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

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

Genome Biology 22.1 (Jan. 2021) p. 28. 2021

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

Doruk Beyter, Helga Ingimundardottir, Asmundur Oddsson, Hannes P. Eggertsson, Eythor Bjornsson, Hakon Jonsson, Bjarni A. Atlason, Snædis Kristmundsdottir, Svenja Mehringer, Marteinn T. Hardarson, Sigurjon A. Gudjonsson, Droplaug N. Magnusdottir, Aslaug Jonasdottir, Adalbjorg Jonasdottir, Ragnar P. Kristjansson, Sverrir T. Sverrisson, Guillaume Holley, Gunnar Palsson, Olafur A. Stefansson, Gudmundur Eyjolfsson, Isleifur Olafsson, Olof Sigurdardottir, Bjarni Torfason, Gisli Masson, Agnar Helgason, Unnur Thorsteinsdottir, Hilma Holm, Daniel F. Gudbjartsson, Patrick Sulem, Olafur T. Magnusson, Bjarni V. Halldorsson, and Kari Stefansson

Nature Genetics (2020). 2020

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

Helga Ingimundardottir and Thomas Philip Runarsson

Journal of Scheduling 21.4 (Aug. 2018) pp. 413–428. 2018

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

Florian Zink, Droplaug N. Magnusdottir, Olafur T. Magnusson, Nicolas J. Walker, Tiffany J. Morris, Asgeir Sigurdsson, Gisli H. Halldorsson, Sigurjon A. Gudjonsson, Pall Melsted, Helga Ingimundardottir, Snædis Kristmundsdottir, Kristjan F. Alexandersson, Anna Helgadottir, Julius Gudmundsson, Thorunn Rafnar, Ingileif Jonsdottir, Hilma Holm, Gudmundur Ingi Eyjolfsson, Olof Sigurdardottir, Isleifur Olafsson, Gisli Masson, Daniel F. Gudbjartsson, Unnur Thorsteinsdottir, Bjarni V. Halldorsson, Simon N. Stacey, and Kari Stefansson

Nature Genetics 50.11 (Oct. 2018) pp. 1542–1552. Springer Science and Business Media LLC, 2018

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

Helga Ingimundardottir and Sylvain Lalot

Heat Transfer Engineering 32.3-4 (2011) pp. 349–357. 2011

international peer-reviewed conferences/proceedings

Generating Training Data for Supervised Learning Linear Composite Dispatch Rules for Scheduling

Helga Ingimundardottir and Thomas Philip Runarsson

9th International Conference on Learning and Intelligent Optimization (LION'09), 2015

Evolutionary Learning of Weighted Linear Composite Dispatching Rules for Scheduling

Helga Ingimundardottir and Thomas Philip Runarsson

International Conference on Evolutionary Computation Theory and Applications (ECTA), 2014

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

Helga Ingimundardottir and Thomas Philip Runarsson

Learning and Intelligent Optimization (LION6), 2012, Paris, France

Supervised Learning Linear Priority Dispatch Rules for Job-Shop Scheduling

Helga Ingimundardottir and Thomas Runarsson

Learning and Intelligent Optimization (LION5), 2011, Rome, Italy

Sampling Strategies in Ordinal Regression for Surrogate Assisted Evolutionary Optimization

Helga Ingimundardottir and Thomas Philip Runarsson

Intelligent Systems Design and Applications (ISDA), 11th International Conference on, 2011, Cordoba, Spain

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

Helga Ingimundardottir and Sylvain Lalot

International Conference of Heat Exchanger Fouling and Cleaning VIII, 2009, Schladming, Austria

seminars

Supervising Learning Linear Composite Dispatch Rules for Scheduling

Helga Ingimundardottir

ReiDok13 Symposium on Computational PhD Projects, 22. Apr. 2013

Creating Meaningful Training Data for Difficult JSSP Instances for Ordinal Regression

Helga Ingimundardottir

Seminar for Ph.D. students, 28. Mar. 2012

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

Helga Ingimundardottir

Stats colloquium, 16. Feb. 2012

Generating Training Data for Learning Linear Composite Dispatching Rules for Scheduling

Helga Ingimundardottir

ReiDok12 Symposium on Computational PhD Projects, 3. Dec. 2012

Supervised Learning Linear Priority Dispatch Rules for Job-Shop Scheduling

Helga Ingimundardottir

Research Symposium, RVoN, 9. Oct. 2010