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

2009–2016 **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.

2015, 2023– 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 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 a board member in 2023.

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.

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 *Sampling Strategies in Ordinal Regression for Surrogate Assisted Evolutionary Optimization*, 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*, 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 *Detection of Fouling in a Cross-Flow Heat Exchanger Using Wavelets*, 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

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 Eggertsson, Eyþór Björnsson, Hákon Jónsson, Bjarni Atlason, Snaedis Kristmundsdottir, Svenja Mehringer, Marteinn Hardarson, Sigurjon Gudjonsson, Droplaug Magnusdottir, Aslaug Jonasdottir, Adalbjorg Jonasdottir, Ragnar Kristjánsson, Sverrir Sverrisson, Guillaume Holley, Gunnar Palsson, Olafur Stefansson, and Kari Stefansson

Nature Genetics *53 (June 2021) pp. 779–786. 2021*

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*

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