helga ingimundardóttir

computational engineer

contact

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languages

Icelandic mother tongue
English fluency
French & Danish
conversational

programming

all-purpose: C#, C++
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

Worked on a doctorate on hyperheuristcs under the guidance of Prof. Tomas Philip Runarsson. The main focus of the study is on Job Shop Scheduling Problems (JSP) and Flow Shop Problems (FSP) and how to automate the scheduling process using e.g. ordinal regression. Moreover, I inspected ”problem difficulty” and ”algorithm’s footprints in instance space”.

courses in Ph.D. programme: ethics of science and research, communication skills for doctoral students, leadership skills for doctoral students, research plans and applications writing, theoretical statistics, high performance computing A and B

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 investigated the possibility of using models to detect fouling in a cross-flow heat exchangers, by only using measurements that are attainable in normal operation of the heat exchanger. The on-line detection of fouling is used by a new and more general method that also takes into account that the input can be varying.

The new method finds a threshold for fouling based on the estimate of the steady states of the effectiveness, which is done by applying a wavelet transform since the transform is localised in both time and frequency.

The parameters of the method need to be chosen carefully, e.g. compromise between the frequency and time localisation, thus a multiple objective genetic algorithm is implemented for the optimisation.

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

2016–2021 deCODE Genetics — Reykjavik, Iceland

Research Scientist for deCODE's statistical department.
I was in charge of implementing and maintaining the Oxford Nanopore Technologies long range sequencing analysis pipeline for start of ONT sequencing at deCODE. I worked closely with the lab department in deciding the protocol from LIMS to work with the downstream analysis. Along with collaborating with the ITO in making necessary changes to our cluster and disk architecture in order to process the exuberant amount of data (roughly 6 petabyte over past three years) in an efficient manner, in terms of computational cost (cpu and gpu hours) and most importantly assuring data integrity.

2015–2016 AGR Dynamics — Reykjavik, Iceland

SQL Consultant for AGR 5
AGR 5 is a fully web based solution for supply chain management. AGR 5 helps users to visualise sales history and makes order proposals using statistical forecasting. My role for AGR 5 is on the back-end, with data implementation and database maintenance.

2015 RANNIS — Reykjavik, Iceland

Advisor in Technology Development Fund
I was on the advisory board that reviews grant applications submitted to the Technology Development Fund at The Icelandic Centre for Research (RANNIS). The role of the fund is to support R&D in the field of technological development aimed at innovation in the Icelandic economy. Donations in the Technology Development Fund 2004–2014 were a total 8,580 million ISK, thereof 1,372.5 million ISK for 2015.

2013–2015 VALKA — Kopavogur, Iceland

Computational Engineer in Research and Development
Full time researcher at Valka, which specializes in the development and marketing of equipment and automation solutions for the fish processing industry. Valka was the recipient of the Icelandic Innovation Award 2013.
Detailed achievements:

- Designed and implemented an intelligent fish portioning algorithm, based on fillet's X-Ray imagery.
- Generalised their fish bone detection algorithm in order to analyse more species. Fast calculations, yet sufficiently accurate, for real-world processing plants.
- Collaborator on three dimensional visualisation of fish bones, based on stereo-vision.
- Conducted and prepared reports for efficiency tests.

2007–2009 LANDSBANKINN — Reykjavik, Iceland

Summer Intern at Testing Department
Worked on making automated tests in Quick Time Professional for personal on-line banking.
Summer Intern at Quantitative Research and Trading Support for the FX and Derivatives Sales
Worked on estimating the behaviour of the EUR/ISK currency cross using Support Vector Machines.
Summer Intern at Business Support
Worked on Level 1 technical support. It entailed setting up software and providing elementary technical assistance to the employees of Landsbankinn via phone or remotely accessing their computers.

academic experience

2011–2012 University of Iceland, Industrial Engineering Department Reykjavik Iceland
Associate Lecturer (i. stundakennari) in Operations Research
Responsible for the under graduate course Operations Research (IDN401G), spring semesters 2011 and 2012.
During that period, I restructured the course under the guidance of Gudrun Geirsdottir at School of Education. Moreover, as a result of my efforts in innovating the course design, assessment and evaluations of tutorials, I inspired a fellow teacher in Natural Sciences, and we were awarded a teaching grant for the University for developing our methods further.

2007–2010 University of Iceland, Industrial Engineering Department Reykjavik Iceland
Assistant Teacher (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

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 and 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 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.

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.

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

publications

Literature available on **Research Gate**

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, Snaedis 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*

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*

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*

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*

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

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

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

Supervised Learning Linear Priority Dispatch Rules for Job-Shop Scheduling
Helga Ingimundardottir and Thomas Runarsson
Learning and Intelligent Optimization (LION5), 2011, Rome, Italy

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