JOEL HILMERSSON

Architect
Structural Engineer
Programmer

About

Versatile **computational designer** and **engineer** with a background in architecture and structural engineering, currently working within the field of software for design and manufacturing. My main interest lies in computational tools for **geometry**, **fabrication** and **design space exploration**; and how we can leverage technology to turn innovative design concepts into physical reality.

Contact

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joelhilmersson.com
github.com/joelhi

Education

M. Arch: Architecture & Urban Design
Chalmers University of Technology
09.2017 - 06.2019

Master in architecture & urban design with a focus on digital design and fabriction.

M. Sc: Structural Engineering & Building Technology
Chalmers University of Technology
09.2016 - 06.2019

2016 - 2017 TU Delft, ERASMUS exchange
Studies in structural engineering with a focus on computational mechanics.

Thesis project: Isogeometric analysis & form finding

B. Sc: Architecture & Engineering
Chalmers University of Technology
09.2012 - 06.2015

Interdisciplinary program at the faculty of architecture.

Professional Experience

Ai Build
Computational Geometry Engineer - London UK
06.2023 -

Working as part of the computational geometry team
- Developing geometric algorithms to automate the process for robotic additive manufacturing
- Implementing research papers to bring state of the art capabilities into our geometric engine
- R&D on topics related to data driven design for manufacturing
- Providing day to day assistance to our Customer Success team on anything geometric

Skills: *Java, Large Format Additive Manufacturing, Software development, Data Structures & Algorithms*

Generative Engineering
Computational Engineer - London UK
01.2023 - 05.2023

A start up developing a cloud based platform enabling generative design in engineering at scale.
- Developed generative models for various engineering applications, mainly focussed on generative geometry and lo-fi fabrication analysis
- Implemented adapters linking design exploration to cloud based FE-simulation (SimScale) using their API

My time at Generative was cut short due to funding uncertainty.
Skills: *Computational Geometry, Python, Generative Algorithms, Software Development*

AKT II - Applied Research Team
Computational Designer - London UK
02.2020 - 01.2023

Working in the specialist computational design team, on a mix of design, software and research projects.
- Lead Developer for the in house interoperability toolkit Reakt (C#, Grasshopper)
- Complex geometry modeling and FEA analysis for projects of all scales, from sculptures to airports
- Collaborated with world renowned architects such as Foster + Partner, Zaha Hadid etc.
- Contributed to a Horizon2020 research project on collaborative design in VR
- Conducted internal research on topics related to modeling, meshing, workflow automation etc.

Skills: *Rhino / Grasshoper, Visual Studio, C#, Python, git, various FE-analysis packages and APIs*

Sunneroe Architects
Computational Designer - Gothenburg Sweden
08.2019 - 11.2019

Short term employment while looking for jobs abroad.
- Developed a grasshopper toolkit to design apartment layouts generatively (Python)

Bollinger + Grohmann
Intern - Oslo, Norway
05.2018 - 09.2018

3d Modeling, Structural Analysis and Multi Objective Optimisation. Mainly early stages / competitions.

Knippers Helbig Advanced Engineering
Intern - Stuttgart, Germany
06.2015 - 06.2016

Computational design for projects globally focussing on complex geometry, with architects such as ACME, Diller Scofidio + Renfro and UN Studio

Skills: *Grasshopper, Nurbs, FEA*

Academic Involvment

PrismArch (Horizon 2020 research project)

Involved in the PrismArch Horizon project while at AKT II. Main contribution to the following deliverables.

- **PrismArch Deliverable 2.3:**
  Final revised version of parametric space of design, algorithms for AI assisted editing/design in VR, and algorithms for designer modelling
  Contributed chapter 4.2.3 documenting my research on applying the evolutionary algorithm presented to shape optimsation for shell structures, conluded as a framework in grasshopper developed in C#.

- **PrismArch Deliverable 1.2:**
  Elaborated report of cross-discipline principles-rules-constraints, and interfaces definition for cross-disciplinary and multi-simulation perspectives in VR
  Contributed chapter 2.1, 2.2 and 2.3 featuring a review of current AEC ontologies.

Advances In Architectural Geometry 2018

Local host and participant at the workshop Digitally Implicit Morphologies.

Conference Papers

IASS 2023 Conference Paper:
Design Space Exploration of Shell Structures Using Quality Diversity Algorithms
K. Sfikas, A, Liapis, <u>J. Hilmersson</u>, J. Dudley, E. Tibuzzi, G. Yannakakis

IASS 2021 Conference Paper:
The Geldeford Riband
D. Godfrey, J. Dudley, <u>J. Hilmersson</u>

IASS 2019 Conference Paper:
Isogeometric Analysis and Form Finding of Thin Elastic Shells
<u>J. Hilmersson</u>, J. Olsson, M. Ander, Prof. Fredrik Larsson

Teaching Involvement

2015 - 2019
Tutor, Chalmers University
Space & Geometry: Architecture & Engineering Year 1
Structural Mechanics: Architecture & Engineering Year 3
Solid Mechanics: Civil & Architecture & Engineering Year 2
Exploring Architecture using Digital Design: Architecture Year 1+2
Mathematical Sketching: Architecture & Engineering Year 1
Mathematical Analysis: Architecture & Engineering Year 1
Form & Technics: Architecture Year 1

Software & Knowledge

Modeling and Graphics
Rhino/Grasshopper (Advanced),
Revit/Rhino.Inside (Basic)
Vray, AdobeCS (AI,PS,ID)

Programming
C# (Advanced)
Python (Good)
Java (Good)
C++ (General C# interop)
Rust (Sparetime)
git

Analysis and Simulation
Sofistik
SAP2000 (+API)
Karamba, Kangaroo etc.
APIs ETABS, Robot, Simscale

Manufacturing
Desktop 3D Printing using both SLA and FDM
General knowledge of
- CNC milling
- Large Format Additive Manufacturing
- G-code