JOEL HILMERSSON

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About

Versatile **software developer** 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.

Professional Experience

Aibuild | London, UK
Early Series-A hire focused on developing algorithms for 5-axis robotic additive manufacturing at industrial scale. Contributed to the core slicing engine as part of the specialist computational geometry team.

Senior Geometry Engineer | May 2024 – Present
• Lead geometry-focused product features, bringing research from the lab into the hands of users, in close collaboration with design and platform teams, (e.g. metal repair from 3D scans and parametric mould design tools).
• Integrated external libraries into the Java engine via JNI, enabling advanced mesh (CGAL) and point cloud processing (PCL).
• Implemented a toolpath quality analysis and optimisation framework, using geometric data (e.g., porosity, overhangs, curvature) to improve print reliability.

Computational Geometry Engineer | June 2023 – April 2024
• Developed core slicing engine functionality, including non-planar and adaptive slicing strategies, enabling entry into new domains including medical and construction industries.
• Implemented papers into production-ready code, such as polygon skeleton graphs, UV parameterization techniques, and scalar & vector field driven toolpath generation.

Key Skills: Java, C++, Computational Geometry, Additive Manufacturing, R&D

Generative Engineering | London, UK
A start-up software company developing a platform for generative design in engineering. I joined the company in pre-seed.

Computational Engineer | Jan 2023 – April 2023
• Explored the application of generative models for engineering applications.
• PoC integration of cloud-based FE simulations via SimScale's API.

Key Skills: Python, Generative Design, Design Optimisation,

AKT II | Applied Research | London, UK
Worked as part of the software development team, which is a sub-group of the wider interdisciplinary applied research team.

Computational Designer | Feb 2020 – Jan 2023
• Lead the development of "Reakt", an in-house interoperability toolkit for parametric workflows, integrating design and analysis software through a bespoke object model (C#).
• Supported projects with finite element analysis (FEA) and complex parametric modeling, collaborating with leading architects such as Foster + Partners and Zaha Hadid Architects.
• Contributed to the Horizon 2020 PrismArch project as a domain expert.
• Conducted internal R&D on FEA meshing, workflow automation, and computational modeling, providing custom tools for various project teams.

Internships & Part time work

• Sunneroe Architects | Gothenburg, Sweden | 2019
Part-time external consultant. Developed a generative grasshopper toolkit for automated apartment layout design. Using Rhino, Grasshopper, Python.

• Bollinger + Grohmann | Oslo, Norway | 2018
FEA Analysis & Multi-Objective Optimization.
Using Rhino, Grasshopper, C#, Karamba, RFem.

• Knippers Helbig | Stuttgart, Germany | 2015 - 2016
Computational design for complex geometry and FEA for projects globally.
Using Rhino, Grasshopper, C#, Sofistik.

Education

Chalmers University of Technology | Gothenburg, Sweden
M.Arch | Architecture & Urban Design | Sept 2017 - Aug 2019
• Master in architecture & urban design with a focus on digital design and robotic fabrication.

M.Sc | Structural Engineering & Building Technology | Sept 2016 – Aug 2019
• Master in engineering with a focus on structural mechanics and FEA.
• Thesis: Isogeometric analysis & form finding.
Wrote a design tool for form active thin shells. (Grasshopper/ MATLAB/ C#)

B.Sc | Architecture & Engineering | Aug 2012 – June 2015
• Interdisciplinary bachelor's degree, combining design studies with engineering and maths.

Delft University of Technology | Delft, Netherlands

Erasmus | Computational Mechanics | Sept 2016 – Aug 2017
• 1 Year ERASMUS scholarship as part of engineering master.
Studies in engineering with a specialisation in computational mechanics.

Academic & Research Projects

PrismArch | Horizon2020 | 2020 – 2023
An interdisciplinary research project bridging academia and industry to explore VR-based design workflows. Collaborators included Zaha Hadid Architects, ETH Zurich, and the University of Malta. Funded by the EU's Horizon 2020 program.

• Applied research on evolutionary algorithms in collaboration with AI researchers at the University of Malta, resulting in a shape optimization framework for structural design (C#).

• Authored key sections of Horizon 2020 deliverables, on the topics of cross-disciplinary AEC ontologies and algorithmic design principles.

Conference Papers

• IASS 2023 | ***Design Space Exploration of Shell Structures Using Quality Diversity Algorithms***
K. Sfikas, A, Liapis, J. Hilmersson, J. Dudley, E. Tibuzzi, G. Yannakakis

• IASS 2021 | ***The Geldeford Riband***
D. Godfrey, J. Dudley, J. Hilmersson

• IASS 2019 | Isogeometric Analysis and Form Finding of Thin Elastic Shells
J. Hilmersson, J. Olsson, M. Ander, Prof. Fredrik Larsson

Tutoring | Chalmers University of Technology | 2015 – 2019
Courses: • Space & Geometry • Structural Mechanics • Solid Mechanics • Digital & Parametric Design

Technical Skills

Programming: C#, Java, Python, Rust, C++ (interop via JNI/.NET), cmake, git
Simulation: Sofistik, SAP2000, ETABS, RFem (APIs)
Geometry & Modeling: Rhino, Grasshopper, Blender
Graphics & Visualization: Adobe CS (AI, PS, ID)
Manufacturing: SLA/FDM, LFAM
Core skills: Linear/Nonlinear FEA/IGA, Geometry (NURBS, Implicit, Meshes)