

Magnus Fredriksson

Curriculum Vitae

Born:	1984-04-06
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Research interests

Computer simulation, CT-scanning, Process control, Sawmilling, X-ray scanning, Wood manufacturing

Education

2014 PhD in Wood Technology, Luleå University of Technology, Sweden
2009 MSc in Mechanical Engineering, Linköping University, Sweden
2003 Upper secondary diploma from the Natural Sciences programme, Östra Gymnasiet, Umeå, Sweden

Positions

2020-present Senior Lecturer at Luleå University of Technology, Division of Wood Science and Technology.
2018-present Senior Project Manager at RemaSawco AB.
2017-2020 Associate Senior Lecturer at Luleå University of Technology, Division of Wood Science and Technology.
2016 Visiting Postdoctoral Fellow at University of British Columbia, Vancouver, Canada.
2014-2016 Researcher at Luleå University of Technology, Division of Wood Science and Technology.
2010-2014 PhD student at Luleå University of Technology, Division of Wood Science and Technology.
2012-2014 Local representative in Skellefteå for the PhD student association, Luleå University of Technology.
2013 Five weeks as guest student at Forstliche Versuchs- und Forschungsanstalt Baden-Württemberg (FVA), Freiburg, Germany.
2008-2009 Master thesis project at Rasch AB, Motala, Sweden (<http://www.rasch.se/>)

Teaching

Lecturer:

2020 Mechanics and strength of materials, 1st level course. Luleå University of Technology.
2020 Electricity and thermodynamics, 1st level course. Luleå University of Technology.
2019 Mechanics and Experimental Methods, 1st level course. Luleå University of Technology.
2014-2018 Physics 1, 1st level course. Luleå University of Technology.
2015-2020 Wood manufacturing, process and material optimization, 3rd level course, Luleå University of Technology.
2017-2018 Elementary Physics G1, High school Supplementary Course. Luleå University of Technology.

2015 Mechanical wood processing, 3rd level course. Module “Advanced technologies in primary and secondary solid wood processing”. Eduarde Mondlane University, Maputo, Mozambique.

Teaching assistant combined with lecturing:

2011–2018 Mathematics I – Calculus, 1st level course, Luleå University of Technology.

2014–2017 Mechanics and strength of materials, 1st level course, Luleå University of Technology.

Teaching assistant:

2015–2018 Physics with electrical engineering, 1st level course, Luleå University of Technology.

2015–2017 Mathematics III – Differential equations and transforms, 1st level course, Luleå University of Technology.

2012–2015 Wood manufacturing, process and material optimization, 3rd level course, Luleå University of Technology.

2012 Joinery CAD/CAM, 1st level course, Luleå University of Technology.

Supervision of student projects, PhD:

2016–present Assistant supervisor of PhD student (Linus Olofsson), Luleå University of Technology.

2015–2019 Assistant supervisor of PhD student (Emilia Markström), Luleå University of Technology. Cancelled by the student due to financing and work situation.

Supervision of student projects, MSc:

2019–2020 Assistant supervisor of MSc thesis project (Ida Kihlgren), Swedish University of Agricultural Sciences.

2011 Assistant supervisor of MSc thesis project (Mikhail Chernykh), Luleå University of Technology.

Other pedagogical merits

Participated in course development:

2020 Electricity and thermodynamics, 1st level course. Luleå University of Technology.

2012 Wood manufacturing, process and material optimization, 3rd level course, Luleå University of Technology.

2011 Mathematics I – Calculus, 1st level course. Luleå University of Technology.

Pedagogical projects:

2015–2016 Development of web-based video lectures for *Mechanics and strength of materials*, 1st level course, Luleå University of Technology.

2013–2014 Development of web-based mathematics diagnosis tool for first year engineering bachelor students, Luleå University of Technology.

Pedagogical courses:

2013 University pedagogy in flexible learning, 7.5 ECTS points, Luleå University of Technology.

2010 University pedagogics, 7.5 ECTS points. Luleå University of Technology.

Professional services

Journal review assignments:

- Annals of Forest Science
- Computers and Electronics in Agriculture
- Forest Products Journal
- Scandinavian Journal of Forest Research
- Wood Material Science and Engineering

Grants

Research project grants:

- 2018 ERA-NET ForestValue under the European Union Horizon 2020: “Resource-Efficient And Data-driven integrated log and board Strength grading (READiStrength): €500 000
- 2015 Stiftelsen ÅForsk + Stiftelsen Tornspiran: “Robust process control in sawmills based on computed tomography scanning”: SEK 195 000 + 35 000

Post-doc scholarship (Swedish):

- 2016 Såg i Syds Jubileumsfond: SEK 20 000
- 2015 Sverige-Amerika Stiftelsen (The Sweden–America Foundation): SEK 85 000

Travelling grants for PhD students (Swedish):

- 2012 Bo Rydins stiftelse (SEK 20 000)
- 2012 Frans och Carl Kempes minnesstiftelse (SEK 100 000)
- 2011 Nordea travelling grant (SEK 12 000)

Pedagogical conferences

- 2014 NU2014, conference for higher education in Sweden, Umeå, Sweden.

Invited presentations

- April 2018 Presentation on sawmill simulation for industrial representatives, Skellefteå, Sweden. Part of a workshop on band- and circular sawing.
- May 2017 Annual board meeting for “Såg i Syd”, the sawmill owners association of south Sweden. Presentation on X-ray CT scanning for sawmills.
- Aug 2011 Inauguration seminar for a wooden pedestrian bridge in Skellefteå, Sweden. Presentation on sawmill simulation.

Journal publications

Fredriksson, M., Cool, J. & Avramidis, S. **Automatic Knot Detection in Coarse-Resolution Cone-Beam Computed Tomography Images of Softwood Logs.** *Forest products journal*, 2019.

Olofsson, L., Broman, O., Skog, J. & Fredriksson, M. **Multivariate product adapted grading of Scots pine sawn timber for an industrial customer, part 1: Method development.** *Wood Material Science & Engineering*, 2019.

Olofsson, L., Broman, O., Skog, J. & Fredriksson, M. **Multivariate Product Adapted Grading of Scots Pine Sawn Timber for an Industrial Customer, Part 2: Robustness to Disturbances.** *Wood Material Science & Engineering*, 2019.

Markström, E., Kitek Kuzman, M., Bystedt, A., Sandberg, D. & Fredriksson, M. **Swedish architects view of engineered wood products in buildings.** *Journal of Cleaner Production*, 2018.

Fredriksson, M., Broman, O. & Sandberg, D. **The Use of CT-Scanning Technology in Wood Value-Chain Research and in Wood Industry: A State of The Art.** *Pro Ligno*, 2017.

Fredriksson, M. & Broman, O. **Factors Affecting Volume Yield in a Forestry-Wood Value Chain: A Simulation Study Based on CT Scanning.** *Pro Ligno*, 2017.

Fredriksson, M., Cool, J., Duchesne, I. & Belley, D. **Knot detection in computed tomography images of partially dried Jack pine (*Pinus banksiana* Lamb.) and white spruce (*Picea glauca* (Moench) Voss) logs from a Nelder type plantation.** *Canadian Journal of Forest Research*, 2017.

Fredriksson, M. **Handling positioning errors when optimizing sawing of Scots pine and Norway spruce logs using CT scanning.** *Journal of Wood Science*, 2016.

- Axelsson, A. & Fredriksson, M. **Potential for increasing volume yield by reducing planing allowance.** *Wood Material Science and Engineering*, 2016.
- Fredriksson, M. **Optimizing sawing of boards for furniture production using CT scanning technique.** *Journal of Wood Science*, 2015.
- Fredriksson, M., Berglund, A. & Broman, O. **Validating a crosscutting simulation program based on computed tomography scanning of logs.** *European Journal of Wood and Wood Products*, 2015.
- Fredriksson, M., Bomark, P., Broman, O. & Grönlund, A. **Using small diameter logs for cross laminated timber production.** *BioResources*, 2015.
- Fredriksson, M., Johansson, E. & Berglund, A. **Rotating Pinus sylvestris sawlogs by projecting knots from computed tomography images onto a plane.** *BioResources*, 2014.
- Fredriksson, M. **Log sawing position optimization using computed tomography scanning.** *Wood Material Science and Engineering*, 2014.
- Fredriksson, M., Broman, O., Persson, F., Axelsson, A. & Ah Shenga, P. **Rotational position of curved saw logs and warp of the sawn timber.** *Wood Material Science and Engineering*, 2014.
- Johansson, E., Johansson, D., Skog, J. & Fredriksson, M. **Automated knot detection for high speed computed tomography on Pinus sylvestris L. and Picea abies (L.) Karst using ellipse fitting in concentric surfaces.** *Computers and Electronics in Agriculture*, 2013.
- Berglund, A., Broman, O., Grönlund, A. & Fredriksson, M. **Improved log rotation using information from a computed tomography scanner.** *Computers and Electronics in Agriculture*, 2013.
- Fredriksson, M., Öhman, M. & Song, H. **Determination of crosscutting safety zone for finger-jointed Pinus sylvestris furniture components.** *Forest Products Journal*, 2012.
- Fredriksson, M. **Reconstruction of Pinus Sylvestris knots using measurable log features in the Swedish Pine Stem Bank.** *Scandinavian Journal of Forest Research*, 2012.
- Broman, O. & Fredriksson, M. **Wood material features and technical defects that affect yield in a finger joint production process.** *Wood Material Science and Engineering*, 2012.

Peer reviewed conference publications

- Fredriksson, M. & Brännström, M. **Technical solutions to increase competitiveness of cross-laminated timber from the Nordic countries: an overview.** In *Proceedings of the 2018 World Conference on Timber Engineering*, Seoul, South Korea, August 2018.
- Fredriksson, M., Broman, O. & Sandberg, D. **The use of CT-scanning technology in wood value-chain research and in wood industry – a state of the art.** In *Proceedings of the 11th International Conference “WOOD SCIENCE AND ENGINEERING IN THE THIRD MILLENNIUM”*, Brasov, Romania, November 2017.
- Fredriksson, M. & Broman, O. **Factors affecting volume yield in a forestry-wood value chain: a simulation study based on CT scanning.** In *Proceedings of the 11th International Conference “WOOD SCIENCE AND ENGINEERING IN THE THIRD MILLENNIUM”*, Brasov, Romania, November 2017.
- Fredriksson, M., Cool, J. & Avramidis, S. **Knot detection in computed tomography images of partially dried Jack pine (Pinus banksiana Lamb.) and white spruce (Picea glauca (Moench)**

Voss) logs. In *Proceedings of the 23rd International Wood Machining Seminar*, pages 57–66. Warsaw, Poland, May 2017.

Fredriksson, M. **Using a Gaussian filter to reduce the effect of positioning errors when optimizing sawing of CT scanned Scots pine and Norway spruce logs.** In *Proceedings of the 23rd International Wood Machining Seminar*, pages 43–56. Warsaw, Poland, May 2017.

Fredriksson, M., Cool, J. & Avramidis, S. **Knot detection in coarse resolution CT images of logs.** In *Proceedings of the 23rd International Wood Machining Seminar*, pages 382–390. Warsaw, Poland, May 2017.

Olofsson, L., Broman, O., Fredriksson, M. & Skog, J. **Customer adapted grading of Scots pine sawn timber: a multivariate method approach.** In *Proceedings of the 23rd International Wood Machining Seminar*, pages 382–390. Warsaw, Poland, May 2017.

Markström, E., Bystedt, A., Fredriksson, M. & Sandberg, D. **Perceptions of Swedish architects and contractors for the use of bio-based building materials.** In *Innovative production technologies and increased wood products recycling and reuse*, pages 19–20. Brno, Czech Republic, September 2016.

Markström, E., Bystedt, A., Fredriksson, M., & Sandberg, D. **Use of bio-based building materials: perceptions of Swedish architects and contractors.** In *New Horizons for the Forest Products Industry.: 70th Forest Products Society International Convention*. Portland, OR, USA, June 2016.

Markström, E., Bystedt, A., Fredriksson, M., & Sandberg, D. **Drivers and barriers for an increased use of bio-based building materials in Sweden.** In *Proceedings of the 12th meeting of the Northern European Network for Wood Science and Engineering (WSE): Wood science and engineering – a key factor on the transition to Bioeconomy*, pages 15–21. Riga, Latvia, September 2016.

Fredriksson, M., Bomark, P., Broman, O. & Grönlund, A. **A trapeze edging method for cross laminated timber panel production.** In *Proceedings of the 22nd International Wood Machining Seminar*, pages 323–332. Quebec City, Canada, June 2015.

Broman, O. & Fredriksson, M. **Effect of raw material on yield in a furniture production process.** In *Proceedings of the 22nd International Wood Machining Seminar*, pages 311–322. Quebec City, Canada, June 2015.

Axelsson A. & Fredriksson, M. **Potential for waste reduction when planing wood.** In *Proceedings of the International Conference on Sustainable Design and Manufacturing*, pages 18–25. Cardiff, Wales, UK, April 2014.

Fredriksson, M. **Log positioning by aid of computed tomography data and sawing simulation.** In *Proceedings of the 21st International Wood Machining Seminar*, pages 83–93. Tsukuba, Japan, August 2013.

Fredriksson, M. **A simulation tool for the finger jointing of boards.** In *Proceedings of the 20th International Wood Machining Seminar*, pages 342–352. Skellefteå, Sweden, June 2011.

Broman, O. & Fredriksson, M. **Wood material features and technical defects that affect the yield in a finger joint production process.** In *Proceedings of the 20th International Wood Machining Seminar*, pages 323–333. Skellefteå, Sweden, June 2011.

Abstracts for conferences

Cool, J., Fredriksson, M., Stephen, J.D., Mabee, W.E., Avramidis, S. & Bull, G.Q. **An integrated forest products cluster for off-grid lumber production using biomass CHP in remote indigenous communities.** In *Proceedings of the 2017 IUFRO Conference: Division 5 Forest Products*. Vancouver, Canada, June 2017.

Fredriksson, M. & Skog, J. **Reconstruction of knots from simulated discrete X-ray images of *Pinus sylvestris* logs.** In *Proceedings of the 2012 IUFRO Conference: Division 5 Forest Products*, page 86. Estoril, Portugal, July 2012.

Communication

Fredriksson, M. & Grönlund, A. **Fingerjointing simulation: first step to complete integration.** *FDM Asia*, 2011.

Research collaboration

- 2016 Visiting postdoctoral fellow at University of British Columbia, Vancouver, Canada.
- 2016 Participated in a Mitacs (<https://www.mitacs.ca/en>) founded project, helping a small indigenous community in British Columbia with a feasibility study for starting up a sawmill industry.
- 2016 Research project commissioned by Holmen Timber, Sweden.
- 2013 Five weeks as guest student at Forstliche Versuchs- und Forschungsanstalt Baden-Württemberg (FVA), Freiburg, Germany.

Other projects

- 2015-2019 Project leader for “Utmana urbaniseringen” (Challenge urbanisation!) A visionary model for business cooperation in sparsely populated areas with the timber industry in Västerbotten County as an example. Financed by the municipalities of Skellefteå and Lycksele, Luleå university of technology, Region Västerbotten, the European Regional Development Fund and various small and medium enterprises in Västerbotten.
- 2015-2019 BERTIM – building energy renovation through timber prefabricated modules. Financed by Horizon 2020 - The EU Framework Programme for Research and Innovation.

Other experience

Compulsory national service in the Swedish Army, 2003-2004. Ground based Casualty Evacuation team.