

Curriculum Vitae – Erik Elfgrén

1 Personal Information

1.1 Name

Erik (Jonathan) Elfgrén



1.2 Date of Birth

December 21st, 1977

1.3 Address

Mail: Tunastigen 93, SE-973 44 Luleå, Sweden

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1.4 Present Employment

2011– Senior Lecturer in Energy Engineering

Department of Engineering Science and Mathematics,
Luleå University of Technology (LTU), Sweden.

1.5 Previous Employment

2010–2011 Post-doc in Energy Engineering

(40% research, 60% teaching)

Department of Engineering Science and Mathematics,
Luleå University of Technology (LTU), Sweden.

2008–2009 Acting Senior Lecturer

(70% teaching, 30% as Director of the National Graduate School of Space Technology)

Department of Applied Physics and Mechanical Engineering, LTU.

2002–2007 PhD Student in Astrophysics

Department of Applied Physics and Mechanical Engineering, LTU.

2001–2002 MSc Student in Particle Physics

Groupe de Physique de Particules, Université de Montréal, Canada.

2000 (8 weeks) Computer Administration

Department of Civil Engineering, LTU.

1999 (11 weeks) CERN Summer Student

CERN (European Laboratory for Particle Physics), Genève, Switzerland.

1998–2000 (124 hours) Assistant mathematics teacher

Department of Mathematics, LTU.

1998 (8 weeks) Optics – interferometry

The Physics and Chemistry of Solids Group (PCS) at the Cavendish Laboratory, University of Cambridge, UK.

1997 (8 weeks) Programming

MEFOS (Foundation for Metallurgical Research), Luleå, Sweden.

1.6 Additional information

Married to Nathalie Caron Elfgrén.

2 Educational Degrees

2.1 Associate Professor Competence

2015 “Handledarutbildning steg 2”.

2006 “Handledarutbildning steg 1”.

2.2 Licentiate and/or PhD Degree

2008 PhD in Physics, “Cosmic dust and heavy neutrinos”, LTU.

2005 Licentiate Degree in Physics, “Dust in the early universe”, LTU.

2.3 Undergraduate and Graduate Degrees

2002 MSc in Particle Physics, Université de Montréal, Canada.

2000 MSc in Engineering Physics, LTU.

3 Scientific Merits

3.1 Research Profile since Doctorate

In general, my research is focused on process integration and energy efficiency in industrial and municipal systems.

2016– Research on renewable energy utilization on a municipal level.

2011–2013 Research on energy optimization in a juice factory (Norrmøjerier, Hedenäset).

2010–2012 Research on energy optimization with the use of exergy in an integrated steel plant (SSAB, Luleå).

2010–2012 Research on energy optimization using mathematical programming in an integrated steel plant (SSAB), a combined heat and power plant (LuleKraft) and a district heating system (Luleå Energi).

3.2 Research Projects

2017–2020 Project leader of the LTU-part of the Northern Periphery and Arctic Programme “Community based energy solutions for remote areas”: LECO.

2016–2018 Project leader of the Swedish part of the Interreg Nord project “Low Carbon Energy Self-sufficient Community”: Arctic Energy.

2011–2013 Project leader of the Swedish part of the Interreg Nord project “Energy and Resource Efficiency in Integrated Juice and Ingredient Production”: Berry.

2010–2012 Interreg Nord project “Network of Expertise for Energy in Cold Climate”: NoE.

2010–2012 Energy Agency project “Exergibegreppet, utvärdering av användning och användbarhet i studier av industriella energisystem”.

3.3 Description of Planned Research

Continued research on energy optimization in industrial and municipal systems.

3.4 List of Publications

(Web of Science, h-index: 12)

3.4.1 Peer-reviewed Publications in International Journals

• Fischer, R., Elfgrén, E., Toffolo, A. (2018), Energy Supply Potentials in the Northern Counties of Finland, Norway and Sweden towards Sustainable Nordic Electricity and Heating Sectors: A Review, *Energies*, 11(4), 751. [Link]

• Grenman, T., Weber, H., Elfgrén, E. (2018), History of Globulets in the Milky Way, *Astrophysics and Space Science*, 363:28. [Link]

- Grenman, T., Gahm, G., Elfgrén, E. (2017), Dusty globules in the Crab Nebula, *Astronomy and Astrophysics*, 599, A110. [Link]
- Anderson, J.-O., Elfgrén, E., Westerlund, L. (2014), Improved energy efficiency in juice production through waste heat recycling, *Applied Energy*, 130, 1 October 2014, pp 757–763. [Link]
- Elfgrén, E., Grip, C.-E., Wang, C. and Karlsson, J. (2010), Possibility to Combine Exergy with other Process Integration Methods for a Steelmaking Case. *Chemical Engineering Transactions*, 21, 2010, pp 1375–1380. [Link]
- Elfgrén, E. and Fredriksson, S. (2008), Mass limits for heavy neutrinos. *Astronomy and Astrophysics*, 479, pp 347–353. [Link]
- Elfgrén, E., Désert, F.-X. and Guiderdoni, B. (2007), Dust distribution during reionization. *Astronomy and Astrophysics*, 476, pp 1145–1150. [Link]
- Elfgrén, E. and Désert, F.-X., (2004), Dust from reionization. *Astronomy and Astrophysics*, 425, pp 9–14. [Link]
- Azuelos, G., Elfgrén E. and Karapetian, G. (2001), Search for the FCNC decay $Z \rightarrow t\bar{q}$ in the channel $t \rightarrow l\nu_b$. OPAL Technical Note 693. This note [Link] and OPAL Papers and Preprints PR345 provide part of the background material to: Abbiendi, G. et al. (2001): The OPAL Collaboration. Search for Single Top Quark Production at LEP2. CERN-EP-2001-066. *Physics Letters B* 521 (2001), pp 181–194 (arXiv:hep-ex/0110009). [Link]
- Azuelos, G., Benckroun, D., Cakir, O., Elfgrén, E., Gianotti, F., Hansen, J.-B., Hinchliffe, I., Hohlfield, M., Jakobs, K., Leroy, C., Mehdiyev, R., Paige, F.E., Polese, G., Stenzel, H., Tapprogge, S., Usubov, Z. and Vacavant, L. (2001), Impact of Energy and Luminosity upgrades at LHC on the Physics program of ATLAS. *J. Phys. G* 28 (2002), pp 2453–2474 (arXiv:hep-ex/0203019). [Link]

3.4.2 Books

- Elfgrén, E. (2008), Cosmic dust and heavy neutrinos. Doctoral Thesis 2007:75, Luleå University of Technology, ISSN 1402-1544 ISRN LTU-DT-07/75-SE, 69 p. [Link]
- Elfgrén, E. (2005), Dust in the early universe. Licentiate Thesis 2005:17, Luleå University of Technology, ISSN 1402-1757 ISRN LTU-LIC-05/17-SE, 31 p. [Link]
- Elfgrén, E. (2002), Heavy and Excited Leptons in the OPAL Detector? Master's Thesis, Université de Montréal, 85 p (arXiv:hep-ph/0209238). [Link]
- Elfgrén, E. (2000), Detection of a Hypercharge Axion in ATLAS. A Monte-Carlo Simulation of a Pseudo-Scalar Particle (Hypercharge Axion) with Electroweak Interactions for the ATLAS Detector in the Large Hadron Collider at CERN. Master's Thesis 2000:334CIV, Luleå University of Technology, ISSN 1402-1617, 54 p (arXiv:hep-ph/0105290). [Link]

3.4.3 Conference Publications

- Elfgrén, E., Grip, C.-E., Karlsson, J. (2011), Exergy as a means for process integration in an integrated steel plant, 1st International Conference on Energy Efficiency and CO₂ Reduction in the Steel Industry, 27 June-1 July, Düsseldorf, Germany, 6p. [Link]
- Grip C., Elfgrén E., Söderström M., Thollander P., Bernström T., Åsblad A., et al (2011). Possibilities and problems in using exergy expressions in processintegration. In: Proceedings of the World Renewable Energy Congress 2011 (WREC 2011), 9–13 May, Linköping. Sweden, Linköping: Electronic Press, 8p. [Link]
- Elfgrén, E. (2001), Detection of a Hypercharge Axion in ATLAS, appearing in “Fundamental Interactions”, Proceedings of the 16th Lake Louise Winter Institute, British Columbia, Canada, World Scientific, pp 185–191 (2002). [Link]

3.4.4 Additional Publications

- Elfgrén, E. and Fredriksson, S. (2007), Are there indications of compositeness of leptons and quarks in CERN LEP data? 5 p (arXiv:hep-ph/0712.3342). [Link]
- Elfgrén, E. (2007), Using Monte Carlo to optimize variable cuts, 3 p (arXiv:hep-ph/0712.3340). [Link]
- Elfgrén, E. (1999), Control System for the Ion Accelerator at ISOLDE. Student lecture presented on 13 August 1999 at CERN, Geneva, Switzerland. Published in CERN Annual Report 1999, p 347. [Link]
- Elfgrén, E. (1998), Moiré Profilometry. Research report for the PCS group, Cavendish Laboratory, University of Cambridge, 27 p. [Link]

3.4.5 Publications of the OPAL collaboration, CERN

- Barate, R. et al. (2003), Search for the standard model higgs boson at LEP. *Physics Letters B* 565: 61–75.
- Abbiendi, G. et al. (2003), Test of noncommutative QED in the process $e^+e^- \rightarrow \gamma\gamma$ at LEP. *Physics Letters B* 568: 181–190.
- Abbiendi, G. et al. (2003), Bose-Einstein correlations of π_0 pairs from hadronic Z_0 decays *Physics Letters B* 559: 131–143.
- Abbiendi, G. et al. (2003), A measurement of semileptonic B decays to narrow orbitally excited charm mesons. *European Physical Journal C* 30: 467–475.
- Abbiendi, G. et al. (2003), Dijet production in photon-photon collisions at $\sqrt{s_{ee}}$ from 189 to 209 GeV. *European Physical Journal C* 31: 307–325.
- Abbiendi, G. et al. (2003), A measurement of the $\tau^- \rightarrow \mu^- \nu_\mu \nu_\tau$ Branching Ratio. *Physics Letters B* 551: 35–48.
- Abbiendi, G. et al. (2003), Search for nearly mass degenerate charginos and neutralinos at LEP. *European Physical Journal C* 29: 479–489.
- Abbiendi, G. et al. (2003), Inclusive analysis of the b quark fragmentation function in Z_0 decays at LEP. *European Physical Journal C* 29: 463–478.
- Abbiendi, G. et al. (2003), Multiphoton production in e^+e^- collisions at $\sqrt{s} = 181$ to 209 GeV. *European Physical Journal C* 26: 331–344.
- Abbiendi, G. et al. (2003), Search for the standard model

Higgs boson with the OPAL detector at LEP. *European Physical Journal C* 26: 479–503.

- Abbiendi, G. et al. (2003), Search for a low mass CP odd Higgs boson in $e^+ e^-$ collisions with the OPAL detector at LEP-2. *European Physical Journal C* 27: 483–495.
- Abbiendi, G. et al. (2003), Measurement of the cross-section for the process $\gamma\gamma \rightarrow p p$ at $\sqrt{s_{ee}} = 183$ to 189 GeV at LEP. *European Physical Journal C* 28: 45–54.
- Abbiendi, G. et al. (2003), Charged particle momentum spectra in $e^+ e^-$ annihilation at $\sqrt{s} = 192$ to 209 GeV. *European Physical Journal C* 27: 467–481.
- Abbiendi, G. et al. (2003), Decay mode independent searches for new scalar bosons with the OPAL detector at LEP. *European Physical Journal C* 27: 311–329.
- Abbiendi, G. et al. (2002), Charged particle multiplicities in heavy and light quark initiated events above the Z_0 peak. *Physics Letters B* 550: 33–46.
- Abbiendi, G. et al. (2002), Measurement of neutral current four fermion production at LEP-2. *Physics Letters B* 544: 259–273.
- Abbiendi, G. et al. (2002), Measurement of the b quark forward backward asymmetry around the Z_0 peak using an inclusive tag. *Physics Letters B* 546: 29–47.
- Abbiendi, G. et al. (2002), Search for scalar top and scalar bottom quarks at LEP. *Physics Letters B* 545: 272–284, 2002, Erratum-ibid. B548: 258.
- Abbiendi, G. et al. (2002), Search for associated production of massive states decaying into two photons in $e^+ e^-$ annihilations at $\sqrt{s} = 88$ to 209 GeV. *Physics Letters B* 544: 44–56.
- Abbiendi, G. et al. (2002), Search for charged excited leptons in $e^+ e^-$ collisions at $\sqrt{s} = 183$ to 209 GeV. *Physics Letters B* 544: 57–72.
- Abbiendi, G. et al. (2002), Measurement of the charm structure function $F_{2,c}^{\gamma}$ of the photon at LEP. *Physics Letters B* 539: 13–24.

3.5 Approved Research Funding

2017–2020 Project leader of the LTU-part of the Northern Periphery and Arctic Programme “Community based energy solutions for remote areas”: LECO.

2016–2018 Project leader of the Swedish part of the Interreg Nord project “Low Carbon Energy Self-sufficient Community”: Arctic Energy.

2011–2013 Project leader of the Swedish part of the Interreg Nord project “Energy and Resource Efficiency in Integrated Juice and Ingredient Production”: Berry.

3.5.1 Funding Courses

2011 Half-day seminar on how to apply for funding from Framework 7.

2010 Course in Fund raising (3 ECTS credits).

3.6 Network/Research Collaboration

2017–2020 LECO-project: Collaboration with Swedish partner: Jokkmokk municipality; Finish partners: Centria UAS, LEO; Irish partners: WDC, Udaras, IE; Norwegian partners: UiT; German partner: AEE; Austrian partner: AT.

2016–2018 Arctic Energy-project: Collaboration with Swedish partner: LTU Social Sciences division; Collaboration with Finish partners: Centria UAS, Lapland UAS, Micropolis Oy; Norwegian partners: UiT, Norut, HiN.

2013– Collaboration with Gösta Gahm, SU.

2011–2013 Berry-project: Collaboration with Finish partner KTUAS.

2010–2012 NoE-project: Collaboration with Swedish partners: Centek, Energikontor Norr; Finish partners: Ouka, Lappia, Ouluinvention, Micropolis, Yski, RAMK; Norwegian partners: Norut, HiN, Bedrifts-kompetanse.

2010–2012 Exergy-project: Collaboration with LiU and Chalmers.

3.6.1 Conferences

2011 Speaker at the 1st International Conference on Energy Efficiency and CO2 Reduction in the Steel Industry, Düsseldorf, Germany (27 Jun-1 Jul).

2011 Co-author of a paper presented at the World Renewable Energy Congress 2011, Linköping, Sweden (8–13 May).

2010 Speaker at the 13th Conference on Process Integration, Modelling and Optimisation for Energy Saving and Pollution Reduction, Prague, Czech Republic (28 Aug-1 Sep).

2008 Participator in the Lindau Nobel Laureate Meetings, Lindau, Germany (29 Jun–4 Jul).

2007 Invited speaker at the Swedish “Astronomdagarna”, Kiruna, Sweden (21–23 Sep).

2006 Poster at the conference “Chemodynamics”, Lyon, France (10–14 Jul), and poster at the conference “Dust from fundamental studies to astronomical observations”, Les Houches, France (30 Apr-5 May).

2003 Poster at the Workshop on “Cosmology and Particle Physics 2003”, CERN, Switzerland (12–17 Jun).

2002 Participator in the Nordita summer school “Cosmology and the High-Redshift Universe”, Abisko, Sweden (5–15 Aug).

2002 Presentation at the OPAL plenary in March and June, CERN, Switzerland.

2001 Presentation of my MSc thesis, Lake Louise Winter Institute, British Columbia, Canada (18–24 Feb).

3.7 Popular Science Communication of Research Results

2011 Popular Science Lecture entitled “The Physical Reality” as part of the program for the celebration of the 40th anniversary of LTU.

2003 Arranged the Physics part of “Vetenskapsdagen” and “Kulturdagen” for the public, Luleå.

2003– Giving popular science presentations regularly to children, prospective students and the general public.

3.8 National and International Research Awards

N/A

3.9 Other Scientific Merits Within and Outside the University

3.9.1 Scientific Prizes

2003 Nordea Scholarship (€ 5,000) for three months research, l'Observatoire de Grenoble, France.

3.9.2 Academy Membership

2003– Member of Svenska Fysikersamfundet.

3.9.3 Peer-review Assignments for Journals

2011 Journal of Renewable and Sustainable Energy.

3.9.4 Other Scientific Merits

Optimization, 2002– Experience of model building and optimization.

Programming, 1993– Matlab, C, Fortran, Visual Basic, Javascript and cgi-scripts (perl, PHP & MySQL).

Computer administration, 1998– Good knowledge of Linux/Unix, fair knowledge of Windows and MacOS.

Languages Fluent Swedish, English and French.

4 Pedagogical Merits

This is a brief summary of my teaching activities. More information about my educational qualifications are available in my [Teaching Portfolio](#).

4.1 Pedagogical Education

4.1.1 Academic Studies in University Pedagogics

2010 “University Pedagogics” (7,5 ECTS credits).

2003 “Pedagogics for University Teachers” (3 ECTS credits).

4.1.2 Certificate of Supervisor Training

2015 “Research Supervision, part 2” (4.5 ECTS credits).

2006 “Research Supervision, part 1 – to Supervise and to be Supervised” (3 ECTS credits).

2006 “Personal Leadership” with the Danish “Personal Management Institute” (3 ECTS credits).

4.2 Basic Educational Ideology

I love teaching! It is inspiring to follow and listen to the students. They often have challenging questions and they think beyond the box. Learning is a joint process between teachers, students and the subject. In my opinion, my task as a teacher is to encourage and stimulate the students – not only to teach the subject.

More details can be found in my [Teaching Portfolio](#).

4.3 Educational Achievements

Scope Nineteen years experience of teaching Physics and Energy topics, both theoretical and practical courses.

Levels Many courses with levels ranging from basic courses at BSc level to advanced courses at MSc and PhD level.

Forms Lectures, lessons, laboratories, project courses, distance education and continuous examination.

4.3.1 Experience of Examination

Examiner Energy-efficient buildings; Thermal and hydraulic machines; Physics 3; Physics and Electricity; Non-linear Physics; Astrophysics and cosmology.

Deputy Examiner Data Analysis (PhD-course); Research Methodology (PhD-course); Physics A (for college students).

4.3.2 Course Development

2017 Development of a new course in Thermal and Hydraulic Components.

2014 Assisting in the development of the course Energy Engineering, project B.

2013 Development of a new course in Energy-efficient buildings.

2011 Assisting in the development of the course Thermal and Hydraulic Machines at LTU.

2011– Continuous development of the courses where I am examiner.

4.4 Supervision

MSc-courses Project courses: “Industrial Energy Processes” and “Energy Engineering, project B”.

MSc theses Supervision of 10 MSc theses, see my [Teaching Portfolio](#).

PhD Co-supervisor of ...

- **Tiia Grenman** (PhD 2018) “Dusty Globules and Globulettes”.

- **Daniel Risberg** (PhD 2018) “Analysis of the Thermal Indoor Climate with Computational Fluid Dynamics for Buildings in Sub-arctic Regions”, Robert Fischer (in progress).

- **Jan-Olof Andersson** (PhD 2014) “Energy and Resource Efficiency in Convective Drying Systems in the Process Industry”.

- Robert Fischer (in progress).

4.5 Teaching Materials

2016– Development of a script-based system for automatic handling of grade reporting, laboratory deadlines and students in the Learning Management System Canvas.

2015– Development of a Handbook of Physics for the university, [Fysika](#).

2012– Development of a web-based progressive autocorrected system, including around 600 assignments, for the courses [Physics 1](#), [Physics 3](#) and [Physics and Electricity](#).

2011 Setting up a laboratory for the new course Thermal and Hydraulic Machines at LTU.

2009– Multiple manuals for lectures and laboratories for teachers and students, see my [Teaching Portfolio](#).

4.6 Educational Planning and Administration

2017– Faculty Program Director of the engineering program Electrical Power Engineering.

2016 Evaluation of a new plagiarism tool for the university.

2014– Member of an educational group at the division.

2014 Evaluation of new Learning Management Systems for the university.

2013– Member of a pedagogical department group.

2013– Research on the impact of web-based assignments for the students.

2010 Co-organizer of an International Masters Programme in Energy Engineering at LTU.

2009 Organizer of two PhD courses, one in “Research Methodology” and one in “Data Analysis”.

2009– Examiner for the course Physics 3 with roughly 500 students, 10 classes and 15 teachers.

4.7 Network/Pedagogical Collaborations

Subject Planning, evaluation and development of the Energy Engineering program.

Division Planning, evaluation and development of the Electrical Power Engineering program.

Department Collaboration and discussions with the Physics teacher community, in particular the examiners of the courses Physics 1, 2 and 3 as well as physics for the Preparatory Programme in Technology (“Tekniskt basår”).

University Collaboration and discussions with the University Pedagogy Centre as well as other teachers at the “Pedagogik på trekvartern”.

National Collaboration and discussions with the directors of studies for Electrical Power Engineering at the Mid Sweden University and Umeå University.

4.8 Pedagogical Awards

2014 LTU:s pris för förnåliga insatser till gagn för utbildning på grundnivå och avancerad nivå – Education Prize from the university, LTU.

2013 Teknologkårens pris till bästa lärare 2013 – Prize to the best teacher of the year from the students, LTU.

2009 Adelpriiset – Prize to the best teacher of the year, LTU.

5 Management Positions

2017– Faculty Program Director of the engineering program Electrical Power Engineering.

2009– Examiner for the course Physics 3 with roughly 500 students, 10 classes and 15 teachers.

2008–2010 (30%) Director of the National Graduate School of Space Technology.

6 Additional Assignments

6.1 Membership on Boards/Committees

2017– Member of the steering committee for the Interreg LECO-project.

2016–2018 Member of the steering committee for the Interreg Arctic Energy-project.

2014– Member of the jury for the regional high-school project competition, Teknikens hus.

2011 Member of the jury for the business energy competition “Energjutmaningen”.

2011–2013 Member of the steering committee for the Interreg Berry-project.

2010–2013 Member of the steering committee and Coordinator of the Energy Efficiency Group within the Interreg Project “Network of Energy”.

1997–1998 Student member of the Board of the Department of Mathematics, LTU.

6.1.1 Other Professional Administrative Assignments

2011–2013 (10%) Head of the Energy Engineering Laboratory at LTU.

2009–2010 Organizer of workshops in the Graduate School of Space Technology: Trollhättan, Sweden (27–29 Jan, 2009), Esrange, Kiruna, Sweden (7–9 Sep, 2009) and IRF, Kiruna, Sweden (30–31 Aug, 2010).

6.2 Business Experience

2011–2012 Participation in the project “Företagsbron” with the objective of increasing the collaboration between companies and LTU.

2010–2013 Collaboration project (“Berry”) with Kemitorneå college and Finnish and Swedish business partners such as Norrmejerier, Hedenäset/Luleå (juice company).

2010– Coordinator of the industrial energy group in Luleå comprising SSAB, Luleå (integrated steel plant), Lulekraft (heat and power plant) and Luleå Energi (district heating).

6.2.1 Other External Contacts

2010– Contacts with Swedish, Norwegian and Finnish Universities and Companies started within the Interreg Project “Network of Energy”.

2010 Planning of an International Masters Programme in Energy Engineering with Narvik University College, Norway, and Oulu University, Finland.

6.3 Pro bono Work/Positions of Trust

2018– Chair of the local Red Cross Organization.

2017– Treasurer and Personnel administrator (for six employees) of the shelter for homeless in Luleå.

2002– Chair, Treasurer, Secretary, Auditor and Member of various local, regional and national church boards for “Equmeniakyrkan”.

7 References

- Professor Marcus Öhman, Head of Energy Sciences, Luleå University of Technology, marcus.ohman@ltu.se.
- Professor Lars Westerlund, Faculty Program Director for the Energy Engineering program, Luleå University of Technology, lars.westerlund@ltu.se.
- Professor Nils Almqvist, Coordinator of the Physics Education, Luleå University of Technology, nils.almqvist@ltu.se.