

CURRICULUM VITAE

Eero Noponen

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Born in Helsinki, Finland, on March 2, 1966.
Finnish citizen. Single.
Military rank: second lieutenant (vänrikki)
Driving license: AB



Education

Doctor of Science (Technology) May 10, 1994, Helsinki University of Technology TKK.

- Doctoral dissertation: “Electromagnetic Theory of Diffractive Optics” (with distinction)

Licentiate of Science (Technology) May 11, 1993, Helsinki University of Technology TKK.

- Main subject: Technical physics (with distinction)
- Subsidiary subject: Information technology
- Licentiate thesis: “Rigorous Diffraction Theory of Computer-Generated Gratings” (with distinction)

Master of Science (Technology) (with distinction) April 23, 1991, Helsinki University of Technology TKK, degree programme in Technical Physics.

- General studies (excellent)
- Subject studies (excellent)
- Advanced studies:
 - Materials physics (excellent)
 - Computer science (excellent)
 - Master’s thesis: “Rigorous Diffraction Analysis of Computer-Generated Gratings” (excellent)

Matriculation examination May 31, 1985, Helsingin suomalainen yhteiskoulu, Helsinki (6 x laudatur).

Language skills

- Finnish: mother’s tongue
- English: fluent
- Swedish: good
- German: adequate

Special skills

- scientific-technological research education
- analytical problem solving
- computer programming and development of numerical algorithms
- implementation of mathematical theories and application to physical problems
- operation, development and administration of Unix and Windows computer systems
- written analysis and presentation

Working experience

Heptagon Oy

Project manager, Web administrator, IT specialist, 1993–

Heptagon Oy was established in 1993 as a spin-off company from Materials Physics Laboratory (Helsinki University of Technology) to commercialize the research work in diffractive optics and micro-optics, and has expanded into an international company with offices and facilities in Switzerland, Singapore and USA.

In the start-up phase I participated in various customer projects in which customized optical components and systems were designed. Since the establishment of the company I have contributed to the development and administration of the IT infrastructure. Since 2006 I have been responsible for the web pages of Heptagon.

Helsinki University of Technology TKK, Radio Laboratory

Researcher, 2005–2006

I worked as a researcher in the project "650 GHz Hologram Compact Antenna Test Range" funded by ESA/ESTEC (European Space Research and Technology Centre), the Academy of Finland and Tekes. In the project a compact test range based on a radio-wave hologram was developed and constructed for testing an 1.5-m satellite antenna at the frequency 650 GHz.

My research topic was the synthesis of phase-modulating holograms (diffractive elements) for use in high-efficiency measurement ranges operating at millimeter wave frequencies. The design and analysis of the holograms is carried out using numerical algorithms and methods derived from diffractive optics and electromagnetic diffraction theory. I reported the formalism and the algorithms I developed for the mm-wave applications in an extensive article in *Applied Optics* (E. Noponen *et al.*, "Design of transmission-type phase holograms for a compact radar-cross-section measurement range at 650 GHz", *Applied Optics* 46, 4181–4196, 2007).

Along with the research work I participated in the administration of the Unix and Linux computer systems of Radio Laboratory.

Helsinki University of Technology TKK, Materials Physics Laboratory / Radio Laboratory

Researcher, 2000–2003

I worked as a researcher in the project "Compact radar-cross-section measurement range based on a phase hologram" funded by the Finnish Defence Forces Technical Research Centre.

I adopted the methods previously developed for visible- and near-visible-wavelength diffractive elements to design and analyze radio-wave holograms operating in the millimeter-wave range. These holograms can be used to transform a diverging spherical wave generated by a radio-wave source (horn antenna) into a planar wave field at a desired distance suitable for placing objects under test or measurement.

In the organizing committees of the "Physics Days 2000" and the "Northern Optics 2003" conferences I was responsible for the design and implementation of the www pages and the abstract processing systems, as well as the production and layout of the Proceedings books.

Helsinki University of Technology TKK

Docent in Computational optics, 1998–2003.

Academy of Finland, Research Council for Natural Sciences and Engineering

Junior researcher, 1996–1999; senior researcher, 1999–2000

My researcher's project was called "Exact synthesis methods for micro-optical diffractive elements". The project was a continuation of previous research in which theoretical formulations and numerical computation methods were developed for the so-called resonance-domain diffraction gratings and other types of diffractive elements containing structural features on the order of or smaller than the wavelength of light.

Helsinki University of Technology TKK, Materials Physics Laboratory

Teaching assistant (laser technology and optics), 1994–1997

Most of the assistantship period I was on leave, working in various researcher posts. I worked as a teaching assistant in the course "Quantum mechanics III" in 1996.

Researcher, 1993–1995

I worked as a researcher in the Eureka project EU-922: "Flat Optical elements Technologies and Applications" (FOTA) funded by Tekes (the Finnish Funding Agency for Technology and Innovation). In the project, theory and design and fabrication methods were developed for planar (flat) optical elements, as well as applications based on these elements. The project was participated by 25 companies and research institutes from five European countries. My own research work focused on the design of various coupling and beam-splitting elements. Part of my contribution to the project was carried out under Heptagon Oy.

Teaching assistant (acting) (laser technology and optics), 1991–1993

The main topics of my research work were the design and analysis of micro-optical elements and diffraction gratings and the development of the required numerical computation methods based on electromagnetic diffraction theory.

I worked as a teaching assistant in "Technical physics laboratory course" in 1992-1994.

Research assistant, 1989–1991.

My tasks included the programming of the laser writing system of computer-generated holograms and the development of computation methods for various types of diffractive elements.

Computer system administrator, 1989–2003

In addition to my research work, throughout my affiliation with Materials Physics Laboratory, I carried the main responsibility for the installation, administration and development of the Unix computer systems of the laboratory and for the operation of the local network. I also acted as the webmaster for the www pages of the laboratory.

Other academic activities

Examination and supervision of academic theses

- Acted as preliminary examiner for five doctoral dissertations and one licentiate thesis.
- Acted as supervisor for one licentiate thesis and one master's thesis.

Scientific publications

- 26 articles in international scientific journals with referee practice.
- 48 articles in international scientific conference proceedings and compilation works.
- 33 articles in Finnish scientific conference proceedings.
- Reviewed over 30 manuscripts for several international journals in the field of optics.

Conferences and meetings

- Participated in 8 international meetings and conferences in Finland, Sweden, Germany, Czech Republic, Hungary, and USA, with 3 oral presentations and 3 posters.
- In the FOTA project several meetings in Germany, Switzerland, France and Finland.
- Large number of national meetings and conferences, in which oral presentations and posters.

Visits in foreign universities and research institutes

- Berliner Institut für Optik, Berlin, Germany, 18.10.1994 – 3.1.1995.

Computer skills

Besides the studies and work I have gathered computer experience with my 30-year interest in computers and programming. I am deeply acquainted with PC's and their architecture and various software and network applications. The utilization of computers and the presence and operation in the network are a natural part of my everyday life.

In the following I will specify in more detail my skills and experience in certain areas.

Studies

My studies included Computer science as the secondary subject of my Master's degree and Information technology as the subsidiary subject of my Licentiate degree. I have taken numerous courses on information technology, computers and programming, including courses on C, FORTRAN, PASCAL, LISP and ADA, data structures and algorithms, operating systems and systems programming, digital image and signal processing, and computer architecture. The courses total over 30 credits (study weeks).

Computer systems and networks

Along with my research work in Materials Physics Laboratory I acted as the developer, instructor and principal administrator of the computer systems, the network and the web pages of the laboratory. Several Unix servers based on SunOS and Solaris operating systems were in use, all of which I was responsible for the installation and administration. In Radio Laboratory I also participated in the administration of Unix and Linux workstations.

Programming languages

In the research work and scientific computing I have used, e.g., C/C++, FORTRAN and MATLAB, and in computer administration and web programming Perl, Procmail and sh (Unix shell). I have also programmed in Assembler and machine languages.

Web pages

I have implemented and maintained several websites, e.g., for Materials Physics Laboratory (1995–2006), Finnish Optical Society (1996–2007), and Heptagon Oy (1996–2000, 2006–). The web technologies I have utilized include CMS, CSS, CGI and JavaScript.

Publishing and editing:

I am experienced with several word processing, desktop publishing and document preparation systems including LaTeX, Word, PageMaker, and Acrobat, as well as with image editing and graphic design applications such as Paint Shop Pro, Designer, and Illustrator.

I was responsible for preparing the proceedings of the conferences "Northern Optics 2003" and "Physics Days 2000". The process was largely automated and based on Perl and Sh scripts programmed by me. The conference papers were submitted through a web form and stored into a database, which was then used to produce a proceedings publication in LaTeX format.

In private life I have carried out the page layout and photo editing of several family books and histories.

Memberships and confidential posts

- Apartment house company Koroistentie 13: vice chair 2000–2003, chairman of the board 2004–
- Tilkan Seudun Kokoomus ry (local party branch of the National Coalition Party): secretary 2008–
- Heptagon Oy: member of the board 1995–2000
- The Vallila Allotment Garden Society (Helsinki): member 1998–
- Finnish Optical Society: member 1996–
- The Finnish Association of Graduate Engineers TEK: member 1991–
- Finnish Physical Society: member 1990–
- Helsingin Kisa-Veikot athletics club: member 1973–