

Curriculum Vitae

Colin James Carlile

Guest Professor, Department of Physics and Astronomy, Uppsala University
Special Advisor, Science Village Scandinavia, Lund
Masters Student, Department of Astronomy and Theoretical Physics, Lund University

Lately, Director General, European Spallation Source, Lund, Sweden
Lately, Guest Professor of Physics, Lund University
Former Director, Institut Laue Langevin, Grenoble, France
Lately, Editor-in-Chief, Journal of Neutron Research

Honorary Professor of Physics, University of Birmingham
Honorary Professor of Physics, NPI, Krakow, Polish Academy of Sciences
Honorary DSc, Birmingham University
Philosophiae Doctorem - Dottorato di Ricerca (h.c.), Università degli Studi di Perugia
Hedersdoktor, LTH, Lund University
Honorary DUniv, Huddersfield University

Commander (KNO) Royal Swedish Order of the Polar Star
Fellow Royal Swedish Academy of Engineering Sciences - IVA
Fellow Kungliga Fysiografiska Sällskapet
Glazebrook Gold Medal & Prize, Institute of Physics



Biographical Details

Born 22nd February 1946, Carlisle, UK - British citizen

Resident in Sweden – Swedish personnummer 460222-4919

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Education & Employment

Schooling	Whitehaven Grammar School, Cumberland, England	1956-1959
	Kendal Grammar School, Westmorland, England	1960-1964
	General Certificate of Education: Ordinary (15 yrs), Advanced (17 yrs) and Scholarship (18 yrs) levels, specialising in Physics, Chemistry, and Mathematics Rugby, athletics, cricket & tennis colours	
	House Captain	1962-1964
	Head Boy (Head of School)	1963-1964
	County Major Scholarship	1964
	Blue Coats School Scholarship	1964
Universities	Leicester University, England	1964-1968
	BSc in Physics	1968
	President of Physical Society, Leicester University	1967-1968
	Birmingham University, England	1968-1972
	MSc in Neutron & Reactor Physics	1969
	Thesis “The neutron flux distribution around a Cold Neutron Source”	
PhD in Neutron Instrumentation	1973	
Thesis “A Rotating Crystal Spectrometer and its use in the study of the Diffusion of Hydrogen in Palladium”		

	DSc (<i>hon. caus.</i>) University of Birmingham	2007
	DUniv (<i>hon. caus.</i>) University of Huddersfield	2013
	Hedersdoktor, (<i>hon. caus.</i>) Lunds universitet	2015
	Philosophiae Doctorem - Dottorato di Ricerca (<i>hon. caus.</i>) Università degli Studi di Perugia	2017
Employment	Research Assistant, Department of Physics University of Birmingham	1969-1972
	Post-doctoral Research Fellow (Boursière) European Union Joint Research Centre, Ispra, Italy	1973
	Research Fellow, The Science Research Council's Rutherford Laboratory near Oxford, UK	1974-1975
	UK Scientific Attaché, Institut Laue Langevin, Grenoble France	1975-1977
	Senior and Principal Scientific Officer, The Science Research Council's Rutherford Appleton Laboratory, Chilton, UK	1978-1993
	Division Head, Spectroscopy Instruments & User Support, ISIS Pulsed Neutron Source RAL, Chilton, UK	1994-1999
	Associate Director & Head of Projects & Techniques Division, Institut Laue Langevin, Grenoble, France	1999-2000
	Director, Institut Laue Langevin, Grenoble, France	2001-2006
	Guest Professor of Physics, Lund University, Sweden	2006-2013
	Director, ESS Scandinavia Secretariat	2007-2009
	Director General & CEO, European Spallation Source ESS AB	2009–2013
	Special Advisor to the CEO, Science Village Scandinavia	2013-today
	Guest Professor, Physics Department, Uppsala University	2014-today
	CEO of Carlile and Carlile AB	2013-today

Representative Positions, Prizes and Honours

 Commander of the Royal Swedish Order of the North Star KNO	2013
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- ✚ Glazebrook Gold Medal and Prize, Institute of Physics, 2007 – for services to neutron scattering
- ✚ Honorary Professor of Physics, University of Birmingham 2006-onward
- ✚ Honorary Professor, Polish Academy of Sciences, Nuclear Physics Institute, Krakow, Poland 2014-onward

- ✚ Honorary Doctor of Science, University of Birmingham 2007
- ✚ Honorary Doctor of the University, University of Huddersfield 2013
- ✚ Hedersdoktor, *dr h.c. (hon. caus.)* Lunds Universitet 2015
- ✚ Philosophiae Doctorem - Dottorato di Ricerca (*hon. caus.*) Università di Perugia 2017

- ✚ Fellow of the Institute of Physics (UK) ~1996-onward
- ✚ Fellow of the Royal Swedish Academy of Engineering IVA 2009-onward
- ✚ Fellow of Kungliga Fysiografiska Sällskapet (Royal Society of Lund) 2014-onward

- ✚ Manager of the year, Lund 2008
- ✚ Honorary Citizen, City of Lund, Sweden 2009
- ✚ The Öresund Prize, Skåne & Greater Copenhagen 2011
- ✚ Region Skåne's Person of the Year 2013

- ✚ Founder Member of European Neutron Scattering Association ~1995
- ✚ Member of the ILL Scientific Council 1996 to 1999
- ✚ Member of the SNS Experimental Facilities Advisory Committee, Oak Ridge, Tennessee, 2000 to 2005
- ✚ Council Member of the IFF Jülich, Germany 2001 to 2005
- ✚ Council Member of the European Physical Society 2002 to 2006
- ✚ Editor-in-Chief, Journal of Neutron Research (publisher IoS Amsterdam) 2003-2017
- ✚ International Review Committee Member KENS, KEK, Japan;
- ✚ International Review Committee Member Bragg Institute, ANSTO, Sydney;
- ✚ International Review Committee Member & Chair, IFJ PAN, Krakow
- ✚ Chairman of EIROforum – European Intergovernmental Research Laboratories – an alliance of the seven large European Experimental Scientific Research Laboratories – CERN, JET, EMBL ESA, ESO, ESRF & ILL - 2005 to 2006
- ✚ Royal Technological Mission to China led by the King of Sweden 2012
- ✚ Chair of EU Expert Panel on Russian Large Research Facilities 2012-2014
- ✚ Member of Administrative Framework Advisory Committee for the International Linear Collider 2013-2014
- ✚ Member of Advisory Committee Lund University 350th Anniversary 2015-2017
- ✚ Chair of ESFRI PSE Neutron Landscape Group 2014-2016
- ✚ Chair of Scientific Panel, International Evaluation Committee, Czech Large Research Infrastructures 2017
- ✚ International Conference Organiser (eg ICNS, Oxford; ECNS, Lund etc.) and Advisory Committee & Scientific Advisory Committee Member for various International Conferences.

- ✚ Co-organiser of and lecturer at a series of 15 Neutron Summer Schools for doctoral and post-doctoral students, held alternatively in Oxford and Sardinia.
- ✚ ~250 invited lectures, seminars, speeches
- ✚ ~220 published papers

Career Profile

An experimental physicist by training and occupation, having specialised in the use of neutron beams for the investigation of the structural properties of solids and liquids (“the materials of everyday life”) – polymers, liquid crystals, intercalates, molecular materials, metal hydrides, pharmaceuticals, magnetic materials... In particular I focused on the building of innovative neutron instrumentation – RXS, GMC, IRIS, IN6, TFXA, PRISMA, OSIRIS at different neutron sources. I moved into managerial, directorial and project management roles from 1993 to 2013, whilst maintaining my links with science, instrumentation and sources, initially as a Division Head at the ISIS pulsed neutron source at Rutherford Appleton Laboratory near Oxford from 1994 to 1999, being responsible for ~50 staff, and then for two years, 1999 to 2000, as the Associate Director & Head of the Projects Division of the Institut Laue-Langevin in Grenoble, responsible for ~110 staff. This was followed for 5 years, 2001 to 2006, as the overall Director of ILL with its ~500 staff. At the end of my contract with ILL I was appointed as Guest Professor at Lund University where I became the Director General of the European Spallation Source AB (a Swedish-Danish company) and its progenitor ESS Scandinavia (under the auspices of Lund University) - approximately 3 years in each role. During that period I and my team built up the organisation from 2 people to 250, secured Lund in Sweden as the site of the European Spallation Source against stiff competition, set up ESS AB, secured international partnership and funding, and completed the final design and costing in the form of a ~1000 page Technical Design Report and handed over to a new team for the construction phase on my formal retirement.

I played a key role in the construction of the ISIS pulsed neutron source which is now operational at the Rutherford Appleton Laboratory near Oxford having joined the project at its inception in 1974, when I returned from Ispra in Italy on a one-year research fellowship. I look back at this year in Italy with great affection since it was to define my European outlook on life. At ISIS I rose from secretary of the international Science Planning Group to become instrument scientist, Group Leader and finally Division Head at ISIS and contributed to the accepted success of this facility – the first accelerator-based neutron source to challenge the pre-eminence of the reactor sources. At that point, in 1999, I transferred to the Institut Laue-Langevin ILL in Grenoble as Deputy Director, and then Director.

ILL is a world-renowned research facility using neutron beams for the study of materials. ~2500 international researchers depend upon the ILL’s facilities for the progress of their research programme. In 2001 I was appointed as the Director of this international research laboratory where I had overall responsibility for the ~500 staff, an annual budget of 85M€, and the safety and security of its facilities including the world’s highest power nuclear research reactor, fuelled with highly enriched uranium. During this period the ILL embarked upon two significant investment programmes;

the Millennium Programme for instruments and infrastructure, and the Seismic Refit Programme.

The former programme started in 2000 and has resulted in an overall gain of a factor ~25 in data output over the whole instrument suite, and has evolved into a continuous programme. Total expenditure was about 38M€. The seismic refit programme of the reactor started in 2002 as a result of a ten-yearly review of the ILL's nuclear facilities by the French *Autorité de Sécurité Nucléaire*. It was completed in early 2007 and involved the investment of 32M€ capital. My final activity at ILL was the publication of a comprehensive Perspectives and Opportunities document of 180 pages laying down an ambitious development plan for this world-leading international neutron source. As a result the ILL was set fair for 20 further years of high quality scientific output.

I then transferred to Lund university in Sweden as Guest Professor in the Physics Department and as part of the European Spallation Source Scandinavia team. After the successful campaign to bring ESS to Lund I was appointed the Director General of the European Spallation Source which is a 1.8B€ project to build the world's next generation flagship neutron source. ESS is 50% funded by the Swedish, Danish and Norwegian governments having achieved the siting decision for the European Spallation Source in Lund in 2009 as part of a European consortium of 17 countries. I worked energetically from 2006 together with Allan Larsson, former Swedish Finance Minister and then President of Lund University, to campaign actively for this large and very visible European science facility to be located in Sweden. ESS is currently in the construction phase, continuing to build up expertise, and assembling the national and international partners. In March 2013, when my contract ended and I reached formal retirement age in Sweden, ESS had ~ 250 staff, an annual budget of ~75M€ p.a. and we had just delivered the Technical Design Report and an updated Costing Report, together with a broad range of detailed documents for different stages of the project, thereby paving the way for an international agreement to start construction in 2013.

Having formally retired in February 2013, on reaching 67 years of age, coinciding with the end of my contract with ESS, I set up my own company and I now am occupied in advising a number of organisations. These include Science Village Scandinavia, the European Commission wrt Russian Large Scale facilities, the International Linear Collider, and as a senior researcher attached to the Freia project at Uppsala University contributing towards the setting up of the uniquely intense neutrino project ESSnuSB led by Professor Tord Ekelöf. From 2014-2016 I was the chair the EU Neutron Strategy Group of ESFRI which delivered its comprehensive report in September of that year. In 2013 I began a Masters course in Astrophysics at Lund University which I will complete during the 2018/2019 semester. I have successfully completed the necessary 8 lecture courses and have begun a research project on Intensity Interferometry with Professor Dainis Dravins as supervisor, involving collaboration with the Catania Institute of Astronomy with the ultimate goal of installing an intensity interferometer option on the Cherenkov Telescope Array being built in Chile and the Canary Islands. I am working with Lektor Anna Thomasson, School of Business and Management, Lund University on Stakeholder Management in Large Facilities and we are preparing a book for publication in 2019. I am preparing a 2nd Edition of the book *Experimental Neutron Scattering* (publisher

OUP), co-authored with BTM Willis of Oxford University, and planned for publication in early 2019.

My career has had four threads:

- **The design and building of scientific instruments** (employing the neutron beams generated in nuclear research reactors or particle accelerators) and being responsible for budgets of up to one hundred million pounds/euros and the associated fund-raising (notably EU, and from National Research Funding bodies), and project management.
- **The investigation of the properties of materials** using the above instruments often in collaboration with University researchers from around the world, notably France, Italy, Germany, the USA, Australia, India and Japan, as well as the UK.
- **Directorial and managerial positions**, including budgets (fund-raising and expenditure) personnel, safety, taking full responsibility.
- **International liaison with scientific and political bodies** and public relations, notably with national Research Ministries and the European Directorate-General for Research, and through Embassies.

Earlier Occupations (additional details)

I was until 2006 the Director of the Institut Laue-Langevin, a world-leading International Scientific Research Laboratory, which groups together the scientific efforts of 12 European countries (UK, Germany, France, Sweden, Switzerland, Spain, Italy, Russia, Belgium, the Czech Republic, Hungary and Austria) in Grenoble, France, employs 500 permanent staff and has an annual budget of 80M€. The capital value of the Institut itself and all its facilities is conservatively estimated at 2.5B€ and the projected eventual decommissioning costs are ~400M€.

The ILL is based upon a 58-megawatt nuclear research reactor, the most powerful in existence, which feeds beams of neutrons to 40 measuring instruments surrounding the reactor core. These instruments are used by small groups of visiting researchers from the partner countries and elsewhere around the world to investigate the properties of those materials of relevance to everyday life. About 2500 researchers from all over the globe undertake research using these facilities and about 700 scientific papers are published each year. It is the most productive such facility in the world and is recognized still as the global flagship in its field against which all other neutron sources are measured.

Such studies give insight into, for example, the strength of spider silk, the microscopic origin of cracking in engineering components such as jet engines, the function of water in fibrous material such as DNA and cellulose, the molecular structure of pharmaceuticals, and the underlying origin of magnetism and superconductivity etc.

Capital investment initiated at ILL included a 32M€ Seismic Refit Programme on the nuclear installations, a 38M€ Instrument renewal programme – the Millennium

Programme, and the fund-raising stages of a 160M€ Infrastructure renewal programme together with those laboratories which share our joint site, The European Molecular Biology Laboratory and the European Synchrotron Research Facility. Project management and fund-raising has therefore been an extremely important part of my responsibilities.

Equally well liaison with nuclear safety authorities at the French national level (ASN), the European level (Euratom) and the International level (IAEA) is paramount, as is our preparedness for very low-probability, though potentially catastrophic, accident response. I am trained hand-on in crises management and communication for such facilities. During this period I led ILL's entry into EIROforum, a consortium of the seven world-class European research facilities, CERN, ESA, ESO, EMBL, JET, ESRF and ILL, that has had a high impact on European science politics. I was chairman of EIROforum from 2005 to 2006.

Most Recent Roles

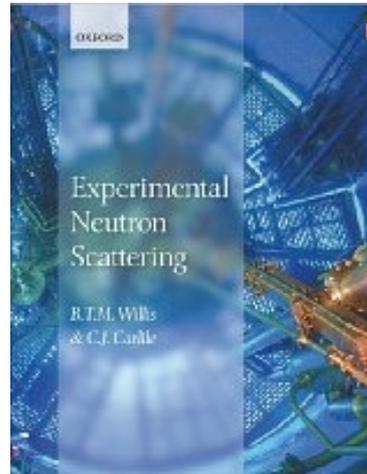
In October 2006, following the conclusion of my contract with ILL, I moved to Lund University as a Guest Professor of Physics and a member of the ESS Scandinavia Consortium led by Prof Karl-Fredrik Berggren, Linköping University. My role was then to increase the capabilities in Sweden for neutron scattering and work towards locating the European Spallation Source (ESS) in Lund, a 1.8B€ source of neutrons for material science research.

Following our lobbying, the Swedish government took the decision to offer significant funding for an ESS bid and set up a secretariat at Lund University, I was appointed as the Director of the Secretariat by decision of the Swedish Cabinet in 2007. A budget of 32MSEK (~3.5M€) was voted to the Secretariat. The mandate of the Secretariat was, broadly speaking, to campaign for the construction of the ESS in Lund and to work at the side of Allan Larsson, government Chief Negotiator, in the Swedish negotiation strategy. In May 2009, after a very vigorous campaign, the decision was taken in Brussels by European Research Ministers to select Lund as the site for ESS. From then on the work of integrating the countries of Europe, setting up a Swedish company and launching a 60M€ Design Update and Costing Review was our goal, successfully completed in February 2013. I had overseen the building up of the ESS organisation to 250 staff when my contract concluded in March 2013, together with ~ 250 scientists and engineers as collaborators in Europe and the rest of the world. ESS in 2014 moved into the first stages of the construction phase and it is now ongoing.

Since March 2013, I have been working as Senior Advisor to Science Village Scandinavia which sits on 18 hectares of land between the neutron source ESS and the synchrotron radiation source MAX IV, and is the designated location for support facilities for these two large scientific research laboratories. In addition I have an appointment as Guest Professor at Uppsala University working on the high intensity neutrino beam project ESSnuSB with Tord Ekelöf. ESSnuSB will be the world's most intense neutrino source, dedicated to unraveling some of the mysteries of the surprising asymmetry of our universe. Furthermore I am a Masters student in

Astrophysics at Lund University from which I get immense satisfaction. I expect to complete this course during 2019.

I have published ~220 papers in academic journals and have written one book “Experimental Neutron Scattering” together with Prof BTM Willis published by Oxford University Press.



C J Carlile

Lund, Sweden
7th September 2018