

## **CURRICULUM VITAE (Mar 2010)**

### **PERSONAL DETAILS**

**Name:** Prof. Dr Christopher Busby

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**Date/Place of Birth:** 01/09/45, Paignton, Devon UK

**Nationality:** British

### **FURTHER/HIGHER EDUCATION**

**Education:** 1966-69 Chemistry, University of London

## **TRAINING AND QUALIFICATIONS**

BSc, PhD, C.Chem, MRSC

**Qualifications:** 1969 University of London First Class Honours Special Degree in Chemistry  
1970-71 SRC research studentship for PhD Physical Chemistry (nmr spectroscopy), Queen Mary College, London  
1974 Elected Member of Royal Society of Chemistry  
1974 Chartered Chemist  
1981 PhD Chemical Physics (Raman spectroscopy/electrochemistry) University of Kent, Canterbury

### **Learned Societies:**

Member: Royal Society of Chemistry  
Member: Royal Society of Medicine  
Member: International Society for Environmental Epidemiology  
Member: Ukraine Committee: Physicians of Chernobyl

### **UK Government Committees**

Member: (Department of Health and DEFRA) CERRIE  
Committee Examining Radiation Risk from Internal Emitters  
2001-2004  
[www.cerrie.org](http://www.cerrie.org)

Member: Ministry of Defence DUOB  
Depleted Uranium Oversight Board  
2002-2007  
[www.duob.org](http://www.duob.org)

### **Other Committees**

Scientific Secretary: European Committee on Radiation Risk  
[www.euradcom.org](http://www.euradcom.org)

Science Policy group Leader: Policy Information Network on Child Health and Environment PINCHE  
[www.pinche.org](http://www.pinche.org)

## **1.2 EMPLOYMENT**

- 1969 – 1975 Research physical chemist, Wellcome Foundation, Beckenham
- 1975 - 1978 Self employed scientific consultant and science writer
- 1979 - 1981 PhD student University of Kent
- 1981- 1982 SERC Research Fellow University of Kent
- 1983- 1992 Self employed scientific consultant and science writer
- 1992- present Science Director, Green Audit, commissioned to research the health effects of ionizing radiation and funded by a number of charities and independent bodies.
- 1995 Funded by the Joseph Rowntree Charitable Trust to write and produce 'Wings of Death- The health effects of low level radiation.'
- 1997-2000 Directed research at Green Audit Funded by Irish State to research health effects of Sellafield
- 1997 Appointed UK Representative of European Committee on Radiation Risk (ECRR)
- 1997 Foundation for children with leukaemia; research on non-ionising radiation
- 2001 Appointed Scientific Secretary of ECRR and commissioned to prepare the report ECRR 2003- The Health effects of low doses of Ionizing Radiation (Published 2003)
- 2001 Appointed to UK Government Committee Evaluating Radiation Risk from Internal Emitters (CERRIE)
- 2001 Appointed to the UK Ministry of Defence Oversight Committee on Depleted Uranium (DUOB)
- 2002 Funded by the Joseph Rowntree Charitable Trust to write a new book on the epidemiological evidence of health consequences of exposure to ionizing radiation: 'Wolves of Water'
- 2003 Appointed Honorary Fellow, University of Liverpool, Faculty of Medicine, Department of Human Anatomy and Cell Biology
- 1992-2008 Science Director, Green Audit
- 2003 Funded by Joseph Rowntree Charitable Trust to write Book *Wolves of Water Cancer and the Environment*
- 2004 Leader of Science Policy for( EU) Policy Information Network for Child Health and Environment *PINCHE* based in Arnhem, The Netherlands
- 2005 3 year research funding by Joseph Rowntree Charitable Trust; Corporate Responsibility in Science and Policy
- 2008 3-year research funding from The Joseph Rowntree Charitable Trust; Corporate Responsibility in Science
- 2008 Appointed Guest Researcher, German Federal Research Laboratories, Julius Kuhn Institute, Braunschweig, Germany

2008 Appointed Visiting Professor, School of Molecular Bioscience, Faculty of Life and Health Sciences, University of Ulster, Coleraine, Northern Ireland

### **1.3 TEACHING EXPERIENCE**

1970	Taught O-level Chemistry part time, Inner London Education Authority
1980-1981	Gave tutorials in quantum mechanics at the Dept. of Chemistry. University of Kent
1995-1997	Invited lecturer at the University of Sussex Dept. of Physics.
1995-1997	Invited lecturer in the University of Wales, `Aberystwyth, Physics Department and Geography Department
2000 – 2005	Invited lecturer in the University of Liverpool Faculty of Medicine SSM5 ‘Environment and Health’ addressing internal radiation risk and cancer epidemiology of small areas.
2005	Invited lecturer University of West of England; Radiation Risk and epidemiology
2006	Invited lecturer: Dept. of Law, University of Wales, Aberystwyth
2006	Invited lecturer: Dept. of Environment, University of West of England
2007	Invited lecturer: Centre for Molecular Bioscience, University of Ulster (annually)

### **1.4 ADMINISTRATIVE EXPERIENCE**

#### **Professional Administration:**

Senior Scientist

Dept of Physical Chemistry, Wellcome Research Laboratory, Langley Park, Beckenham  
Science Director, Green Audit

2004-2006 Leader: Workpackage 6 Science and Policy; PINCHE (EU)

#### **Editorial boards (Current):**

European Journal of Biology and Bioelectromagnetics

#### **Invited Reviewer**

European Journal of Biology and Bioelectromagnetics

European Journal of Cancer

Journal of Public Health (Royal College of Physicians, School of Public Health)

Science and Public Policy  
The Lancet  
Occupational and Environmental Medicine (BMJ)

### **1.5 EXPERT WITNESS**

Since 1997 Chris Busby has been engaged as an expert witness in several cases that relate to the effects of radioactive pollution on health, in several refugee appeals (Kosovo) based on Depleted Uranium risks, several trials of activists accused of criminal damage at weapons establishment and one at the House of Commons (evidence on Depleted Uranium and other radioactive substances), MoD pension appeals tribunals for the widow of a A-Bomb test veteran and once in the Connecticut State Court for an appeal against licensing releases of radioactivity from the Millstone reactor on Long Island Sound. He is currently acting or has recently acted as expert witness on two cases in the UK involving the health effects of internal irradiation from Depleted Uranium. One of these is in the Royal Courts of Justice and also in three cases in the USA. Two of these (against Exxon) have recently been settled. The third, a landmark case involving childhood cancer near a nuclear plant in Florida is currently being appealed in the US Supreme Court. He also advised on the case of Rocketdyne (Boeing) and the Santa Susana Field Laboratory childhood retinoblastoma cluster in Western Los Angeles which was settled in January 2008 and a TENORM radiation case involving Ashland Oil in Martha Kentucky, also other TENORM cases in Louisiana. He is currently also expert witness and advisor on the UK Atomic Test veteran litigation in the Royal Courts of Justice. He has been active in several test veterans pensions appeals tribunals gaining reversal in every case of MoD refusals to pay war service pensions in respect of diseases linked to radiation exposure at the test sites. He testified in 2009 before a coroners jury in the case of the death of Stuart Dyson arguing that Dyson probably died of cancer due to his exposure to depleted uranium in the Persian Gulf. Despite opposition from the MoD the jury unanimously agreed that the uranium exposure was the probable cause of death. A full list and brief description of the court cases in which Dr Busby has been retained as an expert witness is given below.

**Dr Chris Busby**  
**Court cases as expert witness**

<b>Case and lawyer/ team</b>	<b>Court</b>	<b>Year</b>	<b>Details (expertise)</b>	<b>Result</b>
1. R vs Hipperson et al (Charlton)	Newbury Crown Court	1998	Criminal Damage Atomic Weapons Establishment Aldermaston (radiation health effects)	Acquitted
2. R vs Helen John	Middlesex Crown Court	1999	Criminal Damage House of Commons London (uranium health effects)	Acquitted
3. Sellafield Irish Litigation (McGuill, Herr, Irish State)	Dublin High Court	1999-2001	Case against Sellafield THORP reprocessing plant (epidemiology, radiation effects, Irish Sea)	Case withdrawn in 2008
4. Millstone Reactor Public Enquiry	Connecticut State Court	2001	Opposition to relicensing of Millstone Reactor (Radiation health effects and sea dispersion)	Failed
5. Fatmir Mata (Wilson , Berry)	Immigration Appeal Court	2001-2003	Human Rights immigration appeals Kosovo (uranium health effects)	Failed
6. Lela Pelumb (Wilson & Co, Hanley)	Immigration appeal court	2001	Depleted Uranium Kosovo (uranium health effects)	Failed
7. Ladrim Spata (Clare and Co, Hirsch)	Immigration appeal court HX 06027	2001	Depleted Uranium Kosovo (uranium health effects)	Failed
8. Shaquiri, Zogu, Malo, Deda and Hidri vs. Secretary of State Home Office (Henwood)	Immigration appeal court	2002	Depleted Uranium Kosovo (uranium health effects)	Failed
9. Hadjarmata vs Sec.State Home Office (Wesley, Gryk, Amador)	Immigration appeal court	2002	Depleted Uranium Kosovo (uranium health effects)	Failed

10. Mr and Mrs Ardian Kuci vs Sec.State Home Office	Immigration appeal court	2002	Depleted Uranium Kosovo (uranium health effects)	Failed
11. Gerald Adshead vs Ministry of Defence	Pensions appeals court	2002	A-Bomb Test Veteran cancer (epidemiology, radiation health effects)	Won: appeal allowed
12. R.vs Margaret Jones and Erika Wilson (Alan Harris)	Plymouth Crown Court	2002	Criminal Damage Nuclear Submarine base Plymouth (radiation and health)	Acquitted
13. Lee Dell Craft Snr vs Intracoastal Tubular ITCO (Stuart Smith)	New Orleans	2005-	Cancer following exposure to NORM (Epidemiology, radiation and health)	Settled by defendants
14 Barbara Castell vs Intracoastal Tubular ITCO CDC No 2002-12334 Dv A section 5. (Stuart Smith)	New Orleans	2005-	Cancer following exposure to NORM (Epidemiology, radiation and health)	ongoing
15 Ursula Bulot et al vs Exxon Mobil Corp and others (Stuart Smith)	New Orleans	2005-	Cancer following exposure to NORM (Epidemiology, radiation effects)	ongoing
16 James Bailey vs Exxon Mobil Corp and others (Stuart Smith)	New Orleans	2005-	Cancer following exposure to NORM (Epidemiology, radiation effects)	ongoing
17 Zachary Finestone, Lowe et al vs St Lucie Power and Light ( Lytal Reiter, Palm Beach Fla).	Florida USA Case 03-04040 Cohn/Lynch <b>BUSBY DAUBERT MOTION</b>	2005	Case of children with cancer near St Lucie Nuclear Power Station. (Epidemiology, radiation dispersion modelling and health effects)	Case eventually dismissed

18 R.vs Pritchard and Olditch (Bindmann and partners)	Bristol Crown Court	2005-6	Criminal Damage US bombers 2003 (uranium and health) (famous case)	Acquitted
19 R vs RV Jones and Milling (Charlton)	Bristol Crown Court	2005-6	Criminal Damage US bombers (uranium weapons) (famous case)	Acquitted after appeal to Lords
20 Brian Gay vs Ministry of Defence	Pensions Appeals Court	2007	A-Bomb Test veteran Maralinga ; was his kidney cancer caused by radiation? (Epidemiology, radiation and health)	appeal successful
21 Richard David vs Honeywell Normalair Garratt (L.I.P)	Royal Courts of Justice, Queens Bench Divn. London	2007-8	Uranium contamination and health; contaminated via aero engines filters from high altitude (Epidemiology, radiation and health)	Case collapsed; litigant in hospital
22 Cindy Mays and others vs Boeing Rocketdyne Corp (Suzelle Smith)	Los Angeles USA	2007	Did radiation releases from the Rocketdyne SSFL cause retinoblastoma in 9 Los Angeles children? Epidemiology, radiation dispersion modelling and health effects).	Settled by defendants
23 Bonnie Anderson et al vs Ashland Oil (K. Mathis et al)	Lawrence Circuit Court Kentucky USA <b>BUSBY DAUBERT MOTION</b>	2008	Contamination of property by oilfield NORM (Epidemiology, radiation and health)	Case dismissed but being appealed
24. A-Bomb Test veterans vs UK Ministry of Defence (Rosenblatts)	Royal Courts of Justice, London	2009-10	Cancer and illness in A-Bomb Test veterans (Epidemiology, radiation and health)	1 <sup>st</sup> round won, but on appeal

25 Various vs Exxon Mobil Corp (Gordon)	Houston TX	2009-10	Measuring gamma and advising on NORM contamination for potential case	Ongoing
26 Derek Hatton Vs Ministry of Defence (Derek Heaps)	Pensions Appeals Court Birmingham	2009	Cancer and <i>polycythemia rubra vera</i>	See below
27 Etienne Pellegal vs Lincoln Electric Co (Garrison)	New Orleans No 2006-003684 Sec 6 Div L	2009-10	NORM radiation and laryngeal cancer	Settled by defendants
28 Stuart Dyson dec. vs MoD HMCoroner, Balmain)	Coroners Court Black Country Jury	2009	Cause of Death; did depleted Uranium cause cancer. Big case, reported everywhere	Yes
29 Colin Duncan Vs. Ministry of Defence	Pensions appeal Court	2010	Exposure to fallout in A-Bomb Tests caused cancer	Won: Appeal allowed
30 Lowell Ryman vs Regents of University of California (Howell)	Los Alamos USA	2010	Exposure to radioactivity from Los Alamos and Malignant Myeloma	Case withdrawn by attorney
31 Michael Nase vs Teco Energy (Stuart Smith)	New Orleans USA	2009	Exposure to radon and radiation and lymphoma	Ongoing
32 Dawn Pritchard vs Ministry of Defence	Pensions Appeals Court	2010	A-Bomb Test veteran widow. (Radiation and health)	Ongoing
33 L Abdale vs Ministry of Defence (Royal British Legion)	Pensions Appeals Court ENT 00328 2010	2010	A-Bomb Test veteran appeal (Radiation and health)	Ongoing

34 D Battersby vs Ministry of Defence (Royal British Legion)	Pensions Appeals Court ENT 00176	2010	A-Bomb Test veteran appeal (Radiation and health)	Ongoing
35 D Beeton vs Ministry of Defence (Royal British Legion)	Pensions Appeals Court ENT 00129	2010	A-Bomb Test veteran appeal (Radiation and health)	Ongoing
36 T VButler vs Ministry of Defence (Royal British Legion)	Pensions Appeals Court ENT 00078	2010	A-Bomb Test veteran appeal (Radiation and health)	Ongoing
37 D Hatton vs Ministry of Defence (Royal British Legion)	Pensions Appeals Court	2010	A-Bomb Test veteran appeal (Radiation and health)	Ongoing
38 NC Hughes dec vs Ministry of Defence (Royal British Legion)	Pensions Appeals Court ENT00065	2010	A-Bomb Test veteran appeal (Radiation and health)	Ongoing
39 B Lovatt vs Ministry of Defence (Royal British Legion)	Pensions Appeals Court ENT 00279	2010	A-Bomb Test veteran appeal (Radiation and health)	Ongoing
40 D Pritchard vs Ministry of Defence (Royal British Legion)	Pensions Appeals Court ENT 00039	2010	A-Bomb Test veteran appeal (Radiation and health)	Ongoing
41 L Selby vs Ministry of Defence (Royal British Legion)	Pensions Appeals Court ENT 00658	2010	A-Bomb Test veteran appeal (Radiation and health)	Ongoing

42 Denis Shaw vs Ministry of Defence (Royal British Legion)	Pensions Appeals Court ENT 00054	2010	A-Bomb Test veteran appeal (Radiation and health)	Ongoing
43 N Simons vs Ministry of Defence (Royal British Legion)	Pensions Appeals Court ENT 00006	2010	A-Bomb Test veteran appeal (Radiation and health)	Ongoing
44 H Sinfield vs Ministry of Defence (Rosenblatts)	Pensions Appeals Court ENT 00751	2010	A-Bomb Test veteran appeal (Radiation and health)	Ongoing
45 B Smith dec. vs Ministry of Defence (Rosenblatts)	Pensions Appeals Court ENT 00680	2010	A-Bomb Test veteran appeal	Ongoing
46 Mrs A Smith vs Ministry of Defence (Rosenblatts)	Pensions Appeals Court ENT	2010	A-Bomb Test veteran appeal (Radiation and health)	Ongoing
47 D Taylor vs Ministry of Defence (Chris Francis RAFA)	Pensions Appeals Court ENT 00912	2010	A-Bomb Test veteran appeal (Radiation and health)	Ongoing
48 Mrs W Triggs vs Ministry of Defence (Royal British Legion)	Pensions Appeals Court ENT 00285	2010	A-Bomb Test veteran appeal (Radiation and health)	Ongoing
49 Mrs M Williams vs Ministry of Defence (Royal British Legion)	Pensions Appeals Court ENT 00768	2010	A-Bomb Test veteran appeal (Radiation and health)	Ongoing
50 Kingscliffe Waste Watchers vs Augean Ltd	Public Enquiry	2010	Effects of radioactive waste on health (radiation and radioactivity dispersion, exposure and health).	ongoing

**Daubert Motions disallowed.** In two of the above cases — one in the State of Florida, the other in the State of Kentucky — Dr Busby was deposed by defence attorneys with a view to having his status as an expert witness disallowed by the trial judges under the rules of *Daubert vs Merrel Dow Pharmaceuticals* whereby the judges have the power to decide whether an expert witness is expert in the area of expertise being claimed and to disallow his or her testimony if not. In each case the Daubert motion was unsuccessful.

In addition to the above Dr Busby has been invited or commissioned to provide expert evidence on the health effects of low doses of ionising radiation, or exposure to uranium for and to, amongst others :

The UK Royal Society Committee on Depleted Uranium  
 The UK Committee Examining Radiation Risk from Internal Emitters  
 The UK Committee on Radioactive Waste Management  
 The US Congressional Committee on Veterans Affairs and Security in the UK House of Lords (Depleted Uranium)  
 The Canadian Parliament  
 The Greens in the European Parliament  
 The UK Environment Minister Michael Meacher MP  
 The Federal German Agricultural Laboratory, Braunschweig  
 The EU Policy Information Network on Child Health and Environment, Arnhem, Netherlands  
 The British Nuclear Test Veterans Association  
 The UK House of Commons Cross Party Committee on A-Bomb Test Veterans (John Barron MP, Ian Gibson MP)  
 The United Nations (UNIDIR) Geneva  
 The World Health Organisation/ Physicians of Chernobyl (Kiev)  
 The Government of Belarus  
 The Green Party of England and Wales  
 SAFEGROUNDS (Nuclear Industry Organisation for waste disposal discussions)  
 The British Nuclear Energy Society  
 The British Nuclear Test Veterans Association  
 The Royal British Legion  
 The New Zealand Royal Society

### **1.6 APPOINTED or INVITED ADVISOR**

Various national and supra-national groups have sought advice from or appointed Dr Busby as an advisor on various issues e.g.

Green Group European Parliament; Radiation and Health (Caroline Lucas MEP)  
 Canadian Government: Uranium and Health (appointed by Alex Atamenenko MCP, British Columbia)  
 UK Committee on Radioactive Waste Management (invited by Prof Gordon McKerron)

Royal Society Committee on Health Effects of Depleted Uranium Weapons (invited by Prof. Brian Spratt)

US Congressional Committee on Veterans Affairs and Security (Uranium weapons) (invited by Senator Christopher Shays)

UNIDIR Geneva (United Nations Institute for Disarmament Research) (Kirstin Vignard)

## **1.7 RESEARCH INTERESTS.**

### **Overview of major lines of investigation**

Chris Busby spent seven years at the Wellcome Foundation, where he conducted research into the physical chemistry and pharmacology of molecular drug receptor interactions. He subsequently moved to the University of Kent at Canterbury where he studied Laser Raman Spectro-electrochemistry in collaboration with Shell Research and later as SRC Research Fellow, a project which resulted in a PhD in Chemical Physics. He developed and published theoretical and experimental details of silver and gold electrodes with surface array properties which enable acquisition of laser Raman spectra of adsorbed molecules in dilute solution.

In the late 1980s he became interested in the mechanisms of low dose internal irradiation and developed the Second Event Theory, which distinguishes between the hazards of external and internal radiation exposure. In 1995 he was funded by the Joseph Rowntree Charitable Trust to develop his arguments and write 'Wings of Death: Nuclear Pollution and Human Health', an account of the results of his research into radiation and cancer and also into cancer increases in Wales, which he argued were a result of global weapons fallout exposure. In 1997 he became the UK representative of the European Committee on Radiation Risk.

From 1997-2000 he was funded by the Irish Government to carry out research into cancer incidence and proximity to the coast. In June 2000 he was invited to present evidence to the Royal Society committee on Depleted Uranium and health, and shortly after this was invited to Iraq to measure DU in the country and relate exposure to health effects which followed the Gulf War. In 2001 he was asked to visit Kosovo to investigate the dispersion of DU using field monitoring equipment. He discovered DU in many areas from analytical measurements made on samples he collected (paid for by the BBC) he showed that there was atmospheric resuspension of DU particles. His work and expertise in the field of environmental health and radioactivity was recognised by his appointment to CERRIE a Government committee reporting on the effects of low level radiation on health. Following his evidence to the Royal

Society on the effects of Depleted Uranium, he was appointed to the UK Ministry of Defence committee on Depleted Uranium in 2001. He was invited to address the US Congressional Committee on Veterans Affairs of the Health effects of Depleted Uranium in 2002. He is presently also the Scientific Secretary of the European Committee on Radiation Risk and was commissioned to organise the preparation of the new risk model on radiation exposure and to organise the publication of ECRR 2003: The Health Effects of Exposure to low Doses of Ionizing Radiation, published in January 2003 and now translated into and published in French, Russian, Japanese and Spanish. This work he updated with a chapter on Uranium and evidence of the success of the 2003 model in explaining increases in cancer near nuclear sites and also the reports of increases in cancer in Sweden after Chernobyl reported by Tondel et al. in 2010. In 2004, he (jointly with two other colleagues) published the *Minority Report of the CERRIE committee* (Sosiumi Press) which was supported and introduced by Environment Minister the Rt Hon. Michael Meacher MP. In 2006 he produced and jointly edited with Prof. Alexey Yablokov of the Russian Academy of Sciences *ECRR2006 Chernobyl 20 Years On*. A second edition was produced in 2009.

Between 2004 and 2006 he was leader of the Science and Policy Interface Group of the EU funded Policy Information Network for Child Health and Environment (PINCHE) and organised the discussions and collation of information leading to their final report on the issue which he wrote large parts of. The culmination of this project which involved over 40 scientists and physicians from all major EU countries was the recommendation that as a result of bias in scientific advice to policymakers, all advice committees involving areas of dispute and possible harm to the public should be oppositional committees with reports including all sides of any argument.

Since 2006 Dr Busby has been conducting laboratory experiments researching photoelectron emission from Uranium and elements of high atomic number. He is currently co-supervising a researcher at the Centre of Molecular Biosciences in the University of Ulster on this matter.

He is also currently engaged in experimental and theoretical development of a novel theory of living systems and their origin.

## **1.8 RESEARCH EXPERIENCE**

Dr Busby's early research was in the Physical Chemistry aspects of molecular pharmacology at the Wellcome Research Labs. This involved the use of spectroscopic and thermodynamic methods for examining cell drug interactions at the molecular level. For a year he began a research degree in NMR on molecular conformational changes on protonation but left to return to Wellcome and resume his drug interaction research. From there he moved to developing descriptions of intercellular and intracellular communication mechanisms, a subject which he is still engaged in researching in the laboratory. Later he moved to examining molecular behaviour at charged interfaces and developed a Surface Raman

spectroelectrochemical method as a Science Research Council Fellow at the University of Kent.

Between 1992 and 2004 Dr Busby was engaged in research in three areas associated with ionising radiation and health and also was funded for a year (1997) by the *Foundation for Children with Leukemia* to research the interaction between non ionising radiation and ionising radiation. His research in the area of ionising radiation has been split between the development of theoretical descriptions of radiation action on living cells and the epidemiology of cancer and leukaemia in small areas. After 1994 he conducted survey epidemiology of Wales and England and was the first to point out (in a letter to the *British Medical Journal*) that increases in cancer in Wales might be related to weapons fallout. Later he examined childhood leukaemia mortality near the Harwell and Aldermaston nuclear sites and suggested that the excess risk might be related to inhalation of radioactive particles. These results were also carried in a research letter in the *BMJ* which attracted considerable criticism. His description of the mode of radiation action from sequential emitters (his Second Event Theory was developed originally in 1987) has attracted a great deal of interest and also criticism. Between 1997 and 2000 he was funded by the Irish State to carry out epidemiological studies of cancer rates and distance from the Irish Sea using data from Wales Cancer Registry and through a collaboration with the Irish National Cancer Registry. Following this he and his team in Green Audit developed novel small area questionnaire epidemiological methods and applied them to a number of areas in different studies which included Carlingford Ireland, Burnham on Sea in Somerset and Plymouth, Devon and Trawsfynydd, Gwynedd, Wales, which resulted in a TV documentary in 2004. In addition he carried out cancer mortality small area studies in Somerset and later in Essex. He extended these to wards in Scotland in 2002. He has supervised a PhD student, who has subsequently graduated, at the University of Liverpool in the Faculty of Medicine in an epidemiological study of cancer mortality in Scotland with regard to proximity to putative sources of cancer risk. In all the small area studies he carried out it was possible to show a significant effect of living near radioactively contaminated intertidal sediment. The papers and reports were all published by Green Audit and most have been presented by invitation at learned conferences in Europe including through invitations by the Nuclear Industry itself.

In addition to this, in 1998 Busby set up a radiation measurement laboratory and equipped it with portable alpha beta and gamma measuring systems including a portable gamma spectrometer made in Dresden which uses a 2" NaI detector. He used these to show the presence of Depleted Uranium in Southern Iraq in 2000 when he was invited by the Al Jazeera TV channel to visit the country as a consultant and examine the link between leukaemia in children and levels of Depleted Uranium. Since then he has measured radiation spectra in the field in many countries and now employs a 7" detector manufactured in Kharkov to obtain rapid analysis of field gamma radiation. In 2001 he visited Kosovo with Nippon TV and was the first to show that DU was present in dust in towns in Western Kosovo and through isotope measurements funded by the BBC was able to report to the Royal Society in 2001 and the EU Parliament in Strasbourg that DU became resuspended in dry weather and was rained out, and that it remained in the environment for a considerable

time. This subsequently led to UNEP deploying atmospheric particle measuring equipment in areas where DU had been used. More recently, from 2006, Dr Busby has been developing laboratory methods for measuring radiation conversion and amplification by high atomic number micron diameter metal and metal oxide particles (Uranium, Gold). It is his recent contention that such particles amplify background radiation effectiveness by photoelectron conversion and he is the author of a provisional patent application for the use of photoelectrons in cancer therapy to destroy tumours.

In 2005 he was invited by various organisations in New Zealand (NZ Royal Society) to give evidence on the health effects of Depleted Uranium. In 2005 and 2006 he worked with Prof Alexey Yablokov on the ECRR2006 report on Chernobyl which was published on the 20<sup>th</sup> anniversary of the accident. In 2004 he conducted a study of the health of people living in the vicinity of the Trawsfynydd Nuclear plant in Wales for HTV and later also a study of the veterans of the Porton Down human experiments in the 50s. The results of the Porton Down veterans study led to a settlement and an apology by the government to the veterans in 2008. In 2007 he began epidemiological studies of the children of A-Bomb Test veterans and also of people living near mobile phone base stations. The A-Bomb veterans epidemiology study highlighted high rates of miscarriage and congenital illness in their children and grandchildren. The results were presented to the House of Commons committee investigating this issue in November 2007 and have led to a recent agreement by the UK government to fund further epidemiological research on this issue, research which Dr Busby will oversee on behalf of the Test Veterans. In 2005, with Saoirse Morgan he analysed data from the filters of the Atomic Weapons site in Aldermaston and employed NOAA geophysical modelling to show that uranium from Gulf War 2 weapons use had migrated to the UK. He has become interested in the use of Uranium Weapons and has recently been involved in obtaining samples from the Israeli actions in The Lebanon and Gaza and analysing vehicle filters for uranium. His discovery of enriched uranium in such samples has received significant media coverage and resulted in an invitation to write a 12-page article for the United Nations *Disarmament Forum* Journal published in Geneva in 2009. His 2010 study with Malak Hamdan and Entear Ariabi of the cancer increases and sex ratio changes in Fallujah Iraq following the US led attacks on the city has achieved considerable prominence.

He is currently an expert advisor on the Test Veterans' litigation and expert witness on their litigation against the British Government where the initial issue of limitation was recently won in a landmark case in the Royal Courts of Justice. He is official scientific advisor to the British Nuclear Test Veterans' Association and has appeared for them in many legal tribunals for Pension Appeal cases. He was appointed Visiting Professor in the School of Molecular Biosciences in the University of Ulster in 2008 where he is co-supervising research on the health effects of uranium. His uranium photoelectron theory was the top 2-page news story in the *New Scientist* of 6<sup>th</sup> September 2008 and is receiving considerable attention from the international nuclear risk agencies. Also in 2008 he was appointed Guest Researcher at the German Federal Government Julius Kuhn Institute in Braunschweig where he is co-supervising research on Uranium uptake in plants. He is also currently working on

the health effects of radioactive contamination of the Baltic Sea with colleagues in Sweden, Finland and Latvia and has set up offices to organise such research in Riga Latvia and in Stockholm Sweden.

In May 2009, in his capacity as Scientific Secretary of the European Committee on Radiation Risk (ECRR) he organised an International Conference on the Greek Island of Lesvos attended by eminent radiation scientists from all over the world. The final statement from this conference The Lesvos Declaration called for the abandonment of the current (ICRP) radiation risk models which all the delegates agreed was insecure for its purpose of protecting human health from radiation exposures.

### **1.9 INVITATIONS TO SPEAK.**

<b>Year</b>	<b>Place, Subject etc.</b>
1995	House of Commons. Symposium on Low Dose Radiation
1995	Jersey, Channel Islands: International conference on nuclear shipments; Health effects of low dose radiation
1995	Oxford Town Hall: Low dose radiation effects
1995	Drogheda, Ireland: Sellafield effects
1997	Strasbourg EU Parliament: Euratom Directive
1997	Brussels, EU Parliament STOA workshop on criticisms of ICRP risk models
1997	Kingston Ontario: World Conference on Breast Cancer: paper on cohort effects and weapons fallout
1998	Muenster, Germany, International Conference on Radiation: Second Event effects
1998	Manchester Town Hall, Ethics and Euratom
1999	Copenhagen: Danish Parliament: Euratom Directive and low dose effects
1999	Carlingford, Ireland: Sellafield effects
2000	Kos Island: ASPIS (EC) meeting on 'Is cancer an environmental effect'; low dose radiation and cancer
2000	London: Royal Society: low dose effects and Depleted Uranium
2001	Strasbourg: Green Group; Health effects of Depleted Uranium
2001	Bergen: International Sellafield conference, Sellafield effects on health
2001	Oslo: Nobel Institute: Health effects of low dose radiation and DU
2001	London: Royal Society: Health effects of Depleted Uranium (again)
2001	Kiev: WHO conference on Chernobyl: paper on infant leukaemia
2001	Prague: <i>Res Publica</i> International Conference on Depleted Uranium
2001	Strasbourg: EU Parliament, with UNEP; Health effects of Depleted Uranium
2002	Bergen: Conference on Sellafield
2002	Helsinki: Health effects of low dose radiation

2002	London: US Congressional Committee on National Security: Gulf war syndrome and Depleted Uranium
2002	London Greenpeace: Small area statistics and radiation effects
2002	Chilton: Health effects of radioactive waste
2002	Oxford, British Nuclear Energy Society: Effects of low doses of radiation
2002	Royal Society of Physicians: Small area health statistics and radiation
2003	Birmingham: Non ionising radiation. Chaired
2003	Liverpool University: Depleted Uranium and Health
2003	Oxford University: Health Effects of Radiation from Internal Emitters
2003	Munich: Whistleblowers
2003	Copenhagen: Radiation and the foetus
2003	Hamburg: Depleted Uranium
2004	Berlin: Low level radiation
2004	London: PINCHE, child health and environment
2004	London, Westminster: Children with leukaemia
2004	Chicago: Radiation studies
2005	New Zealand Royal Society, Wellington
2005	New Zealand, Auckland University
2005	Chicago: Small area epidemiology by citizen groups
2005	Salzburg, Austria. PLAGÉ; International Nuclear Law and Human Rights
2005	Stockholm, Swedish Parliament; Low Dose Radiation and Depleted Uranium
2006	ECRR, Charite Hospital, Berlin, Health effects of the Chernobyl Accident
2006	Hiroshima Japan, Depleted Uranium
2007	Kuala Lumpur, Depleted Uranium: War Crimes Tribunal
2007	London, House of Commons: Chernobyl and health; anniversary lecture.
2007	London: Safeguards Nuclear Industry CIRIA conference; low dose effects
2007	Blackpool: A-Bomb Veterans and low dose radiation effects
2007	University of Ulster: Childhood leukaemia in Ireland and Sellafield
2007	Hanover: Federal Agricultural Laboratories; Uranium chemistry and physics
2007	Geneva: United Nations. Health effects of Uranium weapons
2007	Geneva: United Nations. Chernobyl: WHO and the IAEA
2007	London, House of Commons Select Committee: Nuclear Test Veterans Children Epidemiology study
2007	London, Royal Society: Science Policy Advice and Scientific Dishonesty
2008	Ljubljana Slovenia: Parliament; Nuclear Energy and Human Health
2008	Malmo Sweden; Uranium and health- new discoveries
2008	Helsinki; Chernobyl effects
2008	Moscow, Russian Academy of Sciences; A new theory of living systems.
2009	Malmo Sweden, Uranium weapons and health
2009	Stockholm Sweden, ICRP, SRM, Errors in radiation risk model

2009	Lesvos Island Greece; Requirements of a Adequate Radiation Risk Model
2009	Academy of Sciences, Riga, Latvia: the ECRR and ICRP radiation risk models
2009	Arusha Tanzania: Health effects of Uranium mining
2009	Dar es Salaam, Tanzania: Health effects of Uranium Mining
2010	Riga Latvia; Environment Ministry; Baltic Sea Radioactivity and Health
2010	Stockholm Sweden; Finlandhuset; Cancer and Birth Defects in Fallujah Iraq

## **2. PUBLICATIONS**

### **PEER REVIEWED PAPERS.**

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<http://www.mdpi.com/1660-4601/6/12/3105>

Busby Chris (2009) Depleted Uranium, Why all the fuss? *Disarmament Forum* 3 25-33 Geneva: United Nations

Busby Chris, Lengfelder Edmund, Pflugbeil Sebastian, Schmitz Feuerhake, Inge (2009) The evidence of radiation effects in embryos and fetuses exposed by Chernobyl fallout and the question of dose response. *Medicine, Conflict, Survival* 25(1) 18-39

Busby Chris (2008) Is there a sea coast effect on childhood leukaemia in Dumfries and Galloway, Scotland, 1975-2002 ? *Occupational and Environmental Medicine* 65, 4, 286-287

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Busby C C and Howard CV (2006) ‘Fundamental errors in official epidemiological studies of environmental pollution in Wales’ *Journal of Public Health* March 22<sup>nd</sup> 2006

Busby C and Fucic A (2006) Ionizing Radiation and children’s health: PINCHE conclusions *Acta Paediatrica* S 453 81-86

- Van den Hazel P, Zuurbier M, Bistrup M L, Busby C, Fucic A, Koppe JG et al (2006) Policy and science in children's health and environment: Recommendations from the PINCHE project. *Acta Paediatrica* S 453 114-119
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- Elsaesser A, Busby C, McKerr G and Howard CV (2007) Nanoparticles and radiation. EMBO Conference: Nanoparticles. October 2007 Madrid
- C. V. Howard, A. Elsaesser & C. Busby (2009) The biological implications of radiation induced photoelectron production, as a function of particle size and composition. *International Conference; Royal Society for Chemistry NanoParticles 2009*  
[www.soci.org/News/~media/Files/.../Oral\\_18\\_32.ashx](http://www.soci.org/News/~media/Files/.../Oral_18_32.ashx)
- Busby CC (2005) Does uranium contamination amplify natural background radiation dose to the DNA? *European J. Biology and Bioelectromagnetics*. 1 (2) 120-131
- Busby CC (2005) Depleted Uranium Weapons, metal particles and radiation dose. *European J. Biology and Bioelectromagnetics*. 1(1) 82-93
- Busby CC and Coghill R (2005) Are there enhanced radioactivity levels near high voltage powerlines? *European J. Biology and Bioelectromagnetics*. 1(2) Ch 7.
- Busby Chris and Bramhall Richard (2005) Is there an excess of childhood cancer in North Wales on the Menai Strait, Gwynedd? Concerns about the accuracy of analyses carried out by the Wales Cancer Intelligence Unit and those using its data. *European J. Biology and Bioelectromagnetics*. 1(3) 504-526
- Busby Chris and Morgan Saoirse (2005) Routine monitoring of air filters at the Atomic Weapons Establishment Aldermaston, UK show increases in Uranium from Gulf War 2 operations. *European J. Biology and Bioelectromagnetics* 1(4) 650-668
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- Busby, C. C. and Cato, M. S. (2000), 'Increases in leukemia in infants in Wales and Scotland following Chernobyl: evidence for errors in risk estimates' *Energy and Environment* 11(2) 127-139
- Busby C.,(2000), 'Response to Commentary on the Second Event Theory by Busby' *International Journal of Radiation Biology* 76 (1) 123-125

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## **BOOKS**

Busby, C. C. (1992), *Low level radiation from the nuclear industry: the biological consequences.* (Aberystwyth: Green Audit)

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Busby, C. C. (1994), *Radiation and Cancer in Wales* (Aberystwyth: Green Audit).

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Busby C.C (2003) ed with Bertell R, Yablokov A, Schmitz Feuerhake I and Scott Cato M. *ECRR2003: 2003 recommendations of the European Committee on Radiation Risk- The health effects of ionizing radiation at low dose--Regulator's edition.* (Brussels: ECRR-2003)  
2004 Translations of the above into French Japanese Russian and Spanish (see [www.euradcom.org](http://www.euradcom.org) for details)

Busby CC, with Bramhall R and Scott Cato MS (2000) *I don't know Much about Science: political decision making in scientific and technical areas.* Aberystwyth: Green Audit (this book influenced the structure and formation of the CERRIE committee and advocates an oppositional structure to

science advisory committees in order to allow for cultural bias in science advice. It has now been carried forward by PINCHE in Europe.).

Busby CC, Bramhall R and Dorfman P (2004) *CERRIE Minority Report 2004: Minority Report of the UK Department of Health/ Department of Environment (DEFRA) Committee Examining Radiation Risk from Internal Emitters (CERRIE)* Aberystwyth: Sosiumi Press

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See also [www.myspace.com/christobusby](http://www.myspace.com/christobusby)

## **CHAPTERS IN BOOKS**

Busby, C. C. (1996a), ' in Bramhall, R. (ed.), *The Health Effects of Low Level Radiation: Proceedings of a Symposium held at the House of Commons, 24 April 1996* (Aberystwyth: Green Audit).

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Busby C.C and Scott Cato M (1999) 'A Planetary Impact index' in Molly Scott Cato and Miriam Kennett eds. *Green Economics- beyond supply and demand to meeting peoples needs*. Aberystwyth: Green Audit

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Busby Chris (2007) New nuclear risk models, real health effects and court cases. Pp 35-46 in- *Updating International Nuclear Law* Eds—Stockinger H, van Dyke JM *et al*. Vienna: Neuer Wissenschaftlicher Verlag

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## **ARTICLES**

Numerous articles for 'The Ecologist' on low dose radiation effects have been translated into most languages and reprinted.

Numerous articles and reports in *Radioactive Times: the Journal of the Low level Radiation Campaign*

## **Main Green Audit published papers**

Busby C and Scott Cato M (2001) *Increases in leukemia in infants in Wales and Scotland following Chernobyl: Evidence for errors in statutory risk estimates and dose response assumptions. Kiev WHO conference paper*. Occasional Paper 2001/7. Aberystwyth: Green Audit

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- Busby C, Dorfman P, Rowe H (2000) *Cancer Mortality and Proximity to Hinkley Point Nuclear Power Station in Somerset: Part I Breast Cancer*. Occasional Paper 2000/2 Aberystwyth: Green Audit
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- Busby C, Rowe H (2000) *Cancer Incidence in Carlingford and Greenore, County Louth: Results of the STAD/ Green Audit Questionnaire* Report 2000/06 Aberystwyth: Green Audit
- Busby C.C (2000), Science on Trial: On the Biological Effects and Health Risks following exposure to aerosols produced by the use of Depleted Uranium weapons. Invited presentation to the Royal Society, London July 19<sup>th</sup> 2000 and also given at the International Conference against Depleted Uranium, Manchester 4<sup>th</sup> November 2000. Occasional Paper 2000/10
- Busby C.C (2001) 'Depleted Uranium in Kosovo: Review of UNEP Report of 13<sup>th</sup> March 2001' Occasional Paper 2001/3 Aberystwyth: Green Audit
- Busby C.C (2001) *Health Risks following exposure to aerosols produced by the use of Depleted Uranium Weapons. Presentation to Res Publica International Conference Prague 24<sup>th</sup> Nov 2001*. Occasional Paper 2001/12 (Aberystwyth Green Audit)
- Busby C.C (2002) 'Review of the Home Office statement on the health Consequences of exposure to Depleted Uranium in Kosovo' Report 2002/2 Aberystwyth: Green Audit
- Busby C.C, (2000) *Radiation from Sellafield and Cancer near the Irish Sea. The Second Annual progress report from the Irish Sea Group in support of the litigation Short and Others vs BNFL and Others* Aberystwyth: Green Audit
- Busby C.C, Dorfman P, Rowe H and Kocjan B (2001), *Cancer mortality and proximity to Oldbury Nuclear Power Station in Gloucestershire 1995-1999. Including all malignancies, female breast, prostate and lung cancer mortality. With an analysis of childhood leukemia incidence in ages 0-4 between 1974 to 1990 in Welsh Areas of Residence*. Occasional paper 2001/6 (Aberystwyth: Green Audit)
- Busby C.C. (2002) 'Lymphoma Incidence in Italian Military personnel involved in Operations in Bosnia and Kosovo' Occasional Paper 2002/3 Aberystwyth: Green Audit
- Busby CC (2000) *From Sellafield to Chernobyl and Beyond: Exposure to man-made ionizing radiation as the primary environmental cause of recent cancer increases*. ASPIS (European Commission DG XVI) Conference: Is cancer predominantly an environmental disease? Kos Island September 2000. Occasional Paper 07/00 Aberystwyth: Green Audit
- Busby C C (2001) On internal irradiation and the health consequences of the Chernobyl accident; Presented at the 6<sup>th</sup> Conference of the British and Irish Charity Organisations

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- Busby, C (1996) 'Childhood Leukemia and Radiation near Newbury', Occasional Paper 96/5 (Aberystwyth: Green Audit).
- Busby, C. C. (1996), 'Nuclear waste reprocessing at Sellafield and cancer near the Irish Sea: arguments for an independent collaborative study' *Occasional Paper 96/1* (Aberystwyth: Green Audit).
- Busby, C. C. (1996), 'Cancer and Leukemia in Children born in Wales and Scotland after Chernobyl: Preliminary Note', *Occasional Paper 96/2* (Aberystwyth: Green Audit).
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- Busby, C. C., Cato, M. S., Kocjan, B., and Mannion, E. (1998), 'Proximity to the Irish Sea and leukemia incidence at ages 0-4 in Wales from 1974-89' *Occasional Paper 98/4* (Aberystwyth: Green Audit).  
*This resulted in a 30 minute BBC TV Wales documentary)*
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- Busby C, Glyn E, Griffiths A, de Messieres M, Morgan S (2006) A Survey of Cancer in the Vicinity of Trawsfynydd Nuclear Power Station. 2006/3 Aberystwyth: Green Audit.  
*(this was the basis for a 40 minute TV documentary by ITV Wales)*
- Busby C, de Messieres M and Morgan S (2006) Did Chemical Exposures of Servicemen at Porton Down Result in Subsequent Effects on their Health? The 2005 Porton Down Veterans Support Group Case Control Study. First Report. Paper 2006/2 Aberystwyth, Green Audit.

*(Shortly after this study was reported in the media the government apologised to the Porton Veterans and gave them £3M compensation)*

Busby Chris, de Messieres Mireille (2007) British Nuclear Test Veterans Association/ Green Audit Children's Health Study 2007 Report 2007/5 Aberystwyth: Green Audit

*(This was presented to the House of Commons Committee on Test Veterans and is the basis for an ongoing discussion with the MoD about further studies of the veterans children and grandchildren)*

Busby Chris, de Messieres Mireille, Morgan Saoirse (2007) Infant and Perinatal Mortality and Stillbirths near Hinkley Point Nuclear Power Station in Somerset, 1993-2005.

Occasional Paper 2007/6 Aberystwyth: Green Audit

*(This was peer reviewed by Derek Pheby of the University of the West of England for the BBC and covered in a short TV documentary by BBC Points West)*

### **BOOK REVIEWS**

'Chernobyl: the definitive history', by RF Mould (Bristol: Institute of Physics): reviewed for 'The Ecologist' in 2001

'Animal Pharm' by Mark Purdey (Clairview Books) reviewed for Caduceus in 2008

### **3. PERSONAL**

Dr Busby has 7 children and 11 grandchildren and lives in Aberystwyth Wales, close to the sea. His interests include music and writing and performing songs (he plays guitar, banjo, diatonic accordion, bandoneon, violin, viola, and Hardanger fiddle: see [www.myspace.com/christobusby](http://www.myspace.com/christobusby)) writing poetry and sailing his 5-ton 1953 wooden yacht *Carefree* which is moored in Pembrokeshire (and belonged to William Penney) and his 65 ton 1903 Dutch Barge *Marius* (which belonged to Susan Ross of New York) based in France in which he is creeping south.