

Christopher Martin Dobson

Curriculum Vitae

Date of Birth: 8 October 1949

Degrees: University of Oxford: BA (First Class), 1971; BSc, 1971; MA, 1974; DPhil, 1976. University of Cambridge: ScD, 2007.

Major Academic Appointments:

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| 1975-1977 | Research Fellow in Chemistry, University of Oxford |
| 1977-1980 | Assistant Professor of Chemistry, Harvard University Visiting Scientist, Massachusetts Institute of Technology |
| 1980-1995 | University Lecturer in Chemistry, University of Oxford |
| 1995-1996 | Reader (Aldrichian Praelector) in Chemistry, University of Oxford |
| 1996-2001 | Professor of Chemistry, University of Oxford |
| 1998-2001 | Director, Oxford Centre for Molecular Sciences |
| 2001- | John Humphrey Plummer Professor of Chemical and Structural Biology, University of Cambridge |
| 2007- | Master of St John's College, University of Cambridge |

Academic Honours include:

Corday Morgan Medal and Prize, The Royal Society of Chemistry, 1983
Howard Hughes International Research Scholar, 1992
Brunauer Award, American Ceramic Society, 1996
Fellow of The Royal Society, 1996
Dewey and Kelly Award, University of Nebraska, 1997
National Lecturer, American Biophysical Society, 1998
Member of the European Molecular Biology Organisation, 1999
Interdisciplinary Award, The Royal Society of Chemistry, 1999
President of the Protein Society, 2001
Doctor Honoris Causa, University of Leuven, Belgium, 2001
Presidential Visiting Scholar, University of California San Francisco, 2001
Bijvoet Medal, University of Utrecht, The Netherlands, 2002
Silver Medal, Italian Society of Biochemistry, 2002
Royal Society Bakerian Lecturer, 2003
Stein and Moore Award, The Protein Society, 2003
Honorary Member, National Magnetic Resonance Society of India, 2004
Fellow of The Academy of Medical Sciences, 2005
Honorary Doctor of Medicine, Umea University, Sweden, 2005
Davy Medal, The Royal Society, 2005
Hans Neurath Award, The Protein Society, 2006

Honorary Doctor of Medicine, University of Florence, Italy, 2006
Doctor Honoris Causa, University of Liège, Belgium, 2007
Sammet Guest Professor, Johann Wolfgang Goethe University, Frankfurt, 2007
Foreign Honorary Member of the American Academy of Arts and Sciences, 2007
Fellow of the International Society of Magnetic Resonance, 2008
Honorary Fellow, Linacre College, University of Oxford, 2008
Honorary Fellow, Lady Margaret Hall, University of Oxford, 2008
Honorary Fellow, Merton College, University of Oxford, 2009
Honorary Fellow, Keble College, University of Oxford, 2009
Royal Medal, The Royal Society, 2009
Honorary Fellow of the Chemical Council of India, 2010
Khorana Award, The Royal Society of Chemistry, 2010
Member of the Academia Europaea, 2011
Honorary Fellow of the Indian Biophysical Society, 2012
Honorary Doctor of Science, King's College London, 2012
Honorary Fellow, Trinity College Dublin, 2013
Foreign Associate of the US National Academy of Sciences, 2013
Vallee Foundation Visiting Professor, 2014
Honorary Fellow, Darwin College, University of Cambridge, 2014
Heineken Prize for Biophysics and Biochemistry, The Royal Netherlands Academy, 2014.
Feltrinelli International Prize for Medicine, Accademia Nazionale dei Lincei, 2014

Invited Lectures include:

Over 300 invited and plenary lectures at international meetings since 1990, as well as over 150 lectures and seminars at universities and research institutions including:

Krebs Lecture, University of Sheffield, 1991
Winzler Lecture, Florida State University, 1991
University Lecture, University of Texas Southwestern Medical Centre, Dallas, 1992
Mill Hill Lecture, National Institute for Medical Research, 1995
John S. Colter Lecture, University of Alberta, 1998
Frederic M. Richards Lecture, Yale University, 1999
Cynthia Ann Chan Memorial Lecture, University of California, Berkeley, 1999
A.D. Little Lectures, Massachusetts Institute of Technology, 2001
Sackler Distinguished Lecture, University of Cambridge, 2002
Wills Lecture, University of London, 2003
Bayer Distinguished Lecture, University of Washington, 2003
Anfinsen Memorial Lecture, Johns Hopkins University, 2003
Joseph Black Lecture, University of Glasgow, 2003
Centenary Lecture, Andersonian Chemical Society, University of Strathclyde, 2004
EMBO Lecture, Biochemical Society, 2004
Presidential Lecture, Scripps Research Institute, La Jolla, 2005
Burroughs Wellcome Lectures, University of East Carolina, 2005
50th Anniversary Lecture, International Union of Biochemistry and Molecular Biology, 2005
Sir John Kendrew Lecture, Weizmann Institute, 2005
William H. Stein Memorial Lecture, Rockefeller University, 2006

John D. Ferry Lectures, University of Wisconsin, 2006
Linus Pauling Lecture and Medal, Stanford University, 2006
Distinguished Lecture, Rutgers University, 2007
Class of 1942 James B. Sumner Lecture, Cornell University, 2008
Ada Doisy Memorial Lecture, University of Illinois, 2008
Weaver Memorial Lecture, University of California, Davis, 2008
Linus Pauling Lecture, California Institute of Technology, 2008
Roy E. Moon Distinguished Lectures, Angelo State University, 2009
Hans Neurath Lecture, University of Washington, 2009
Brian Bert Memorial Lecture, Columbia University, 2010
Alumni Lecture, University of Queensland, 2010
Linacre Lecture, St John's College, University of Cambridge, 2011
T.Y. Shen Lectures, Massachusetts Institute of Technology, 2012
Heron-Allen Lecture, Lady Margaret Hall, University of Oxford, 2012
G.N. Ramachandran Memorial Lecture, Indian Biophysical Society, 2012
William Lloyd Evans Lectures, Ohio State University, 2012
Antonini Memorial Lecture, University of Rome, 2013
Frontiers in Biological Sciences Annual Lecture, Case Western Reserve University, 2014
Searle Distinguished Lecture, Northwestern University, 2014
Philippe Wiener Lecture, Fondation Wiener Anspach, Brussels, 2014

Publications include:

Over 700 papers and review articles in total, including more than 30 in Nature and Science. 150 of these publications are within the last five years. Current h-index (based on citations) is 112.

Research Interests:

My research interests are focused on protein molecules, and particularly on defining the fundamental principles by which they fold to generate function and biological activity, and yet can misfold to generate toxicity and disease. Our studies are highly interdisciplinary and collaborative, and make use of a very wide range of techniques, encompassing theory as well experiment (our primary activity). We are particularly interested in the discovery of the nature, properties, mechanism of formation and biological significance of the 'misfolded' amyloid state of proteins. Amyloid-related diseases include whole-body disorders such as the systemic amyloidoses, neuronal disorders such as Alzheimer's and Parkinson's diseases, and other organ-specific disorders such as type II diabetes. Our major goals are the elucidation of the general molecular principles that underlie this whole family of medical conditions, which are now becoming a major threat to human health and social harmony across the modern world, and the generation of a firm foundation for the rational and effective prevention and treatment of these debilitating and usually fatal conditions.

Research Training:

Many students and post-doctoral scientists have been trained in my laboratory in a wide range of interdisciplinary aspects of biomedical research. Nearly 100 previous members of my research group hold faculty positions or the equivalent in universities and research institutes around the world, over one third of whom are women. Several ex-members of the group have gone on to develop methodologies initiated within our laboratory, particularly directed at biomedical applications of NMR spectroscopy, mass spectrometry, molecular dynamics simulations and nanotechnology. In addition, many previous members of the group are particularly active in research into the underlying principles of protein misfolding its links with human disease. My group

has also developed a wide network of collaborators, and in particular has sought to bring physical scientists from many different disciplines into biomedical research.

Public Service:

I am involved in a range of national and international activities associated with advising and reviewing scientific institutes, research programmes and funding initiatives. I am involved in a variety of ways within organisations such as the University of Cambridge (e.g. chair of the Senior Promotions Committee in Biology and Medical Sciences, and a Deputy Vice-Chancellor) and the Royal Society (e.g. a member of the Nominations Committee and of the Independent Nominating Group for women candidates). Examples of activities on a wider scale include: chairing the Scientific Advisory Board of the Max Planck Institute for Biochemistry in Martinsried, serving as a member of the US National Institutes of Health Structural Genomics Initiative, serving as Scientific Advisor for Life Sciences to the Diamond Light Source (synchrotron) project in the UK, acting as an International Advisor to the Prion Research Program in Canada and to a government-funded project involving 50 research groups in Japan, and serving as President of the Protein Society.

Selected Publications:

S.E. Radford, C.M. Dobson and P.A. Evans, "The Folding of Hen Lysozyme Involves Partially Structured Intermediates and Multiple Pathways", **Nature** **358**, 302-307 (1992).

A. Miranker, C.V. Robinson, S.E. Radford, R.T. Aplin and C.M. Dobson, "Detection of Transient Protein Folding Populations by Mass Spectrometry", **Science** **262**, 896-900 (1993).

D.R. Booth, M. Sunde, V. Bellotti, C.V. Robinson, W.L. Hutchinson, P.E. Fraser, P.N. Hawkins, C.M. Dobson, S.E. Radford, C.C.F. Blake and M.B. Pepys, "Instability, Unfolding and Aggregation of Human Lysozyme Variants Underlying Amyloid Fibrillogenesis", **Nature** **385**, 787-793 (1997).

C.M. Dobson, "Protein Misfolding, Evolution and Disease", **Trends Biochem. Sci.** **24**, 329-332 (1999).

M. Vendruscolo, E. Paci, C.M. Dobson and M. Karplus, "Three Key Residues Form a Critical Contact Network in a Transition State for Protein Folding", **Nature** **409**, 641-646 (2001).

M. Fändrich, M.A. Fletcher and C.M. Dobson, "Amyloid Fibrils from Muscle Myoglobin", **Nature** **410**, 165-166 (2001).

M. Bucciantini, E. Giannoni, F. Chiti, F. Baroni, L. Formigli, J. Zurdo, N. Taddei, G. Ramponi, C.M. Dobson and M. Stefani, "Inherent Cytotoxicity of Aggregates Implies a Common Origin for Protein Misfolding Diseases", **Nature** **416**, 507-511 (2002).

C.M. Dobson, "Getting Out of Shape – Protein Misfolding Diseases", **Nature** **418**, 729-730 (2002).

M. Dumoulin, A.M. Last, A. Desmyter, K. Decanniere, D. Canet, G. Larsson, A. Spencer, D.B. Archer, J. Sasse, S. Muyldermans, L. Wyns, C. Redfield, A. Matagne, C.V. Robinson and C.M. Dobson, "A Camelid Antibody Fragment Inhibits the Formation of Amyloid Fibrils by Human Lysozyme", **Nature** **424**, 783-788 (2003).

F. Chiti, M. Stefani, N. Taddei, G. Ramponi and C.M. Dobson, "Rationalisation of the Effects of Mutations on Peptide and Protein Aggregation Rates", **Nature** **424**, 805-808 (2003).

C.M. Dobson, "Protein Folding and Misfolding", **Nature** **426**, 884-890 (2003).

C.M. Dobson, "In the Footsteps of Alchemists", **Science** **304**, 1259-1262 (2004).

D.M. Korzhnev, X. Salvatella, M. Vendruscolo, A.A. Di Nardo, A.R. Davidson, C.M. Dobson and L.E. Kay, "Low Populated Folding Intermediates of the Fyn SH3 Domain Characterized by Relaxation Dispersion NMR", **Nature** **430**, 586-590 (2004).

K. Lindorff-Larsen, R. B. Best, M. A. De Pristo, C.M. Dobson and M. Vendruscolo, "Simultaneous Determination of Protein Structure and Dynamics", **Nature** **433**, 129-133 (2005).

N. Carulla, G.L. Caddy, D.R. Hall, J. Zurdo, M. Gairi, M. Feliz, E. Giralt, C.V. Robinson and C.M. Dobson, "Molecular Recycling within Amyloid Fibrils", **Nature** **436**, 554-558 (2005).

C.F. Wright, S.A. Teichmann, J. Clarke and C.M. Dobson, "The Importance of Sequence Diversity in the Aggregation and Evolution of Proteins", **Nature** **438**, 878-881 (2005).

F. Chiti and C.M. Dobson, "Protein Misfolding, Functional Amyloid, and Human Disease", **Ann Rev Biochem** **75**, 333-366 (2006).

T.P.J. Knowles, A.W. Fitzpatrick, S. Meehan, H.R. Mott, M. Vendruscolo, C.M. Dobson and M.E. Welland, "Role of Intermolecular Forces in Defining Material Properties of Protein Nanofibrils", **Science** **318**, 1900-1903 (2007).

F. Chiti and C.M. Dobson, "Amyloid Formation by Globular Proteins under Native Conditions", **Nature Chem. Biol.** **5**, 15-22 (2009).

T.P.J. Knowles, C.A. Waudby, G.L. Devlin, S.A. Cohen, A. Aguzzi, M. Vendruscolo, E.M. Terentjev, M.E. Welland and C.M. Dobson, "An Analytical Solution to the Kinetics of Breakable Filament Assembly", **Science** **326**, 1533-1537 (2009).

A. De Simone, A. Dhulesia, G. Soldi, M. Vendruscolo, S.T. Hsu, F. Chiti, and C.M. Dobson, "Experimental Free Energy Surfaces Reveal the Mechanisms of Maintenance of Protein Solubility", **Proc Natl Acad Sci USA** **108**, 21057-21062 (2011).

N. Cremades, S.I. Cohen, E. Deas, A.Y. Abramov, A.Y. Chen, A. Orte, M. Sandal, R.W. Clarke, P. Dunne, F.A. Aprile, C.W. Bertocini, N.W. Wood, T.P. Knowles, C.M. Dobson and D. Klenerman. "Direct Observation of the Interconversion of Normal and Toxic Forms of α -Synuclein", **Cell** **149**, 1048-1059 (2012).

S.I. Cohen, S. Linse, L.M. Luheshi, E. Hellstrand, D.A. White, L. Rajah, D.E. Otzen, M. Vendruscolo, C.M. Dobson and T.P. Knowles, "Proliferation of amyloid- β 42 aggregates occurs through a secondary nucleation mechanism", **Proc Natl Acad Sci USA** **110**, 9758-9763 (2013).

A.W. Fitzpatrick, G.T. Debelouchina, M.J. Bayro, D.K. Clare, M.A. Caparoni, V.S. Bajaj, C.P. Jaroniec, L. Wang, V. Ladizhansky, S.A. Muller, C.E. MacPhee, C.A. Waudby, H. Mott, A. de Simone, T.P.J. Knowles, H.R. Saibil, M. Vendruscolo, E. Orlova, R.G. Griffin and C.M. Dobson, "Atomic-resolution Structure of a Cross- β Amyloid Fibril", **Proc Natl Acad Sci USA** **110**, 5468-5473 (2013).

T.P.J. Knowles, M. Vendruscolo and C.M. Dobson. "The Amyloid State and its Association with Protein Misfolding Diseases", **Nature Rev Mol Cell Biol** **15**, 384-396 (2014).

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