

Prof. ROSS JOHN ANGEL M.A. Ph.D.

Crystallography Laboratory,
Department of GeoSciences,
Virginia Polytechnic Institute & State University,
Blacksburg, VA 24060, USA.

Tel: +1-540-231-7974
Fax: +1-540-231-3386
e-mail: rangel@vt.edu
<http://www.crystal.vt.edu/crystal/rja>

PERSONAL DETAILS

Date of birth: 26-10-1959.
Marital status: Married (to Prof. N.L. Ross)
Nationality: British
Residence: USA

ACADEMIC RECORD

January 2001 - Present

Research Professor in Crystallography, Department of Geosciences, and adjunct Professor in Department of Biological Sciences, Virginia Tech.

Research: The further development of single-crystal diffraction techniques for in-situ studies of minerals at high pressures. As a result of previous technical developments (see below) the evolution of unit-cell parameters of crystals at high pressure can now be routinely measured to 1 part in 30,000. No significant further improvement can be expected. We can now measure extremely subtle changes in cell parameter evolution at high pressures, but are unable to determine the underlying reasons for such changes in the evolution of the crystal structure (i.e. in bond lengths and angles) because crystal structures cannot be determined sufficiently precisely at high pressures. We are now pursuing technical developments at VPI Crystallography Lab aimed at improving the quality of high-pressure structure refinements.

These technical developments are driven by the need to understand the structural basis for the complex compression behaviour observed at high pressures in framework structures including feldspar and perovskites. High-pressure studies on the phase transitions in ferroelastic, ferroelectric and co-elastic materials will build on my previous work in Bayreuth with the aim of understanding the fundamental physics of such transitions, and their relation to phase transitions at high temperature.

I established the Virginia Tech Crystallography Laboratory which is a co-located facility of the Departments of Biological Sciences, Chemistry, and GeoSciences with staff, faculty and students from all three departments. The facility performs service crystallography and conducts research programs across mineralogy, protein and small-molecule crystallography, and maintains a powder diffraction facility for general use of the University.

January 1994 – November 2000

Staff member of the Bayerisches Geoinstitut responsible for X-ray diffraction.

Research: The development of single-crystal diffraction techniques, especially cell parameter measurements, for in-situ studies of minerals at high pressures. At Bayreuth my collaborators and I improved the precision with which

cell parameters can be determined at high pressure by approximately an order of magnitude. This allowed the detailed determination of the high-pressure behaviour of minerals, including feldspars, pyroxenes, amphiboles, and perovskites, and the characterisation of non-quenchable high-pressure phase transitions, crossovers, and compression mechanism changes in these materials.

October 1988 - January 1994

Royal Society 1983 University Research Fellow, jointly at Department of Geological Sciences, University College London and Department of Crystallography, Birkbeck College, University of London.

Research: The determination of feldspar bulk moduli by in-situ high-pressure single-crystal diffraction. The characterisation of non-quenchable displacive phase transitions in anorthite and alkali feldspars at high pressures, including the influence of Al,Si disorder. The characterisation of the compression behaviour and phase transitions in (Mg,Fe)SiO₃ pyroxenes at pressures to 8.5 GPa.

October 1987 - September 1988

Post-doctoral Fellow at the Geophysical Laboratory of the Carnegie Institution of Washington.

Research: Single-crystal diffraction of feldspars at ambient conditions to determine the state of Al,Si order and its variation with thermal treatment. High-pressure diffraction studies of feldspars, and the discovery of a new displacive phase transition in anorthite. Structural studies of superconductors, including the first determination of the structure of the 90K "1-2-3" YBa₂Cu₃O_{7-x} material, and characterisation of several >100K superconductors in the Bi-Ca-Sr-Cu-O and Tl-Ba-Cu-O systems (with LW Finger, CT Prewitt, RM Hazen, and NL Ross).

October 1985 - September 1987

NATO Overseas Research Fellow, first year at State University of New York at Stony Brook, second year at the Geophysical Laboratory, Washington. Supervisor: Dr. C.T. Prewitt

Research: The characterisation of incommensurate structures in insulators by single-crystal X-ray and neutron diffraction.

October 1982 - October 1985

Graduate student in the Department of Earth Sciences, University of Cambridge, England. PhD supervisor Dr. Andrew Putnis (now at Universitaet Muenster, Geremany).

Research: The determination of the factors that determine the relative stabilities of pyroxenes and pyroxenoids. Synthesis of chain-silicate minerals at ambient pressures and high temperatures, and piston-cylinder studies. Characterisation by powder diffraction and high-resolution TEM. Theoretical and computer modelling.

October 1979 - June 1982

Undergraduate of Clare College in the University of Cambridge, England, studying for the Natural Sciences tripos. Courses in mathematics, physics, chemistry, metallurgy and materials science, crystallography, mineralogy and geochemistry. Degree specialisation: Mineral sciences.

1970-1978

Scholarship at Trinity School of John Whitgift, Croydon, Surrey, England. Passed 9 O-levels (8 grade A), 4 A-levels in mathematics, further mathematics, physics, and chemistry (all grade A), and 2 S-levels in physics and chemistry.

SERVICE (current)

- Associate Editor, *European Journal of Mineralogy*, 1994-present.
- Member, Mineral and Rock Physics Committee of AGU, 2002-present.
- Councillor, Mineralogical Society of America 2005-2007
- Meetings coordinator, Mineralogical Society of America 2005-2007
- Member, Facilities Access Panel, ISIS spallation neutron source, UK (panel reviews applications for beam time) 2004 – 2006
- Member, Instrument Design Team for Topaz, the single-crystal diffractometer to be installed at the Spallation Neutron Source at Oak Ridge, 2009

AWARDS AND QUALIFICATIONS

2005: Appointed adjunct professor in the Department of Biological Sciences, Virginia Tech.

2001: Appointed Professor of Crystallography, Department of Geosciences, Virginia Tech.

1998: European Mineralogical Union Medal for Research Excellence.

1993: Max Hey Award of the Mineralogical Society of Great Britain.

1991: Phillips Crystallography Award of the British Crystallographic Association.

1991: Elected Fellow of the Mineralogical Society of America

1991: Appointed Associate Editor of *American Mineralogist*.

1990: Mineralogical Society of America Crystallography Research Grant.

1988: Royal Society University Research Fellowship (10 years).

1987: Carnegie Institution of Washington Post-doctoral Fellowship.

1986: Ph.D. from University of Cambridge.

1986: M.A. from University of Cambridge.

1985: NATO Overseas Research Fellowship.

1982: First class honours B.A. in Mineral Sciences from University of Cambridge.

1979: Open scholarship to Clare College, Cambridge.

PROFESSIONAL AFFILIATIONS

- American Crystallographic Association.
- American Geophysical Union
- Mineralogical Society of America
- Mineralogical Society of Great Britain and Ireland
- Deutsches Mineralogisches Gessellschaft

GRADUATE STUDENTS

- D.A. Hugh-Jones (University College London, PhD 1995)
- T. Hackwell (University College London, PhD 1993)
- I was not allowed under German law by my position in Bayreuth (1994-2000) to supervise graduate students.
- Ms. Theresa Detrie (MSc student, started August 2005)
- Ms. Eleda Johnson (MSc student, started August 2005)

POST-DOCS

1994-2001 in Bayreuth:

- D.R. Allan (now lecturer at Edinburgh)
- Th. Arlt (now with Wella, Neuchatel)
- T. Boffa-Ballaran (now staff member, Bayerisches Geoinstitut)
- R. Miletich (now Prof. Crystallography, Heidelberg).

At Virginia Tech:

- Dr. M. Koch (2004-05, now Heidelberg)
- Prof. M. Bujak (2005-06, now on faculty of University of Opole, Poland)
- Dr. J. Zhao (2002-present)
- Dr. N. Vogelaar (2003-present)
- Dr. C. Vanpeteghem (2004-present)
- Dr. F. Nestola (2005-06, now on faculty of University of Padua, Italy)