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Colloquia](#)[Women in Physics](#)[News and Events](#)[Alumni](#)[Outreach](#)[About the School](#)[Resources](#)[Login](#)[Job Opportunities](#)**College of Sciences**[GRADUATE PROGRAM](#)[UNDERGRADUATE PROGRAM](#)[PEOPLE](#)[VISITORS](#)[CONTACT US](#)

R. A. Young

Professor Emeritus

Email: [r.young \[at\] physics.gatech.edu](mailto:r.young@physics.gatech.edu)**Phone:** (404) 894-5208**Building:** Howey**Office:****Website(s):**[DBWS Program \(software\) \(http://phweb.physics.gatech.edu/downloads/young/DBWS.html\)](http://phweb.physics.gatech.edu/downloads/young/DBWS.html)[A Phoenix for Toulouse \(http://phweb.physics.gatech.edu/people/faculty/young/Phoenix.html\)](http://phweb.physics.gatech.edu/people/faculty/young/Phoenix.html)**Education:**

Ph.D. in Physics, Polytechnic Institute of Brooklyn 1959

MS. in Physics, Georgia Institute of Technology 1951

B.S. in Physics, Georgia Institute of Technology 1950

More information:

Principal research experience is in crystal physics and in the physics and applications of x-ray, electron, and neutron diffraction phenomena and complementary techniques. Specific areas of research experience include: (1) applications of diffraction techniques to crystal physics (atomic-scale mechanisms of physical properties including phase transitions, thermal motions, crystal defects and diffraction line broadening, etc.); (2) x-ray and neutron diffraction studies of biologically important materials (e.g. tooth and bone, apatites); (3) precision determination of structural detail including atomic substitution mechanisms and effects; (4) improvement and extension of diffraction techniques in precision and power and in application to natural materials; (5) thermally-stimulated-current studies (a complementary technique); and, (6) the major emphasis in recent years, methods and applications of crystal structure and related parameter refinements from powder diffraction data (Rietveld Method).

More than 3 decades of teaching experience in physics and materials at graduate and undergraduate levels, primarily for physics and engineering students, plus specially developed diffraction courses.

Employment History since Graduate School

Georgia Institute of Technology

Progression thru the ranks to Research Professor of Physics 1957-1964

Professor of Physics 1964-1987



Professor Emeritus of Physics 1988-present

Special Lecturer (now Emeritus) in Ceramic/Materials Engineering 1960-present

Special Lecturer in Geophysical Sciences 1969-1978

Head, Diffraction Laboratory and then various Branches
(Solid State, Crystal Physics, Applied Physics) in the Engineering Experiment Station (EES) 1957-1982

Institut National Polytechnique de Toulouse
Professeur Associe (Ecole de Chimie) 1983

Biographical Listings:

Who's Who in America; American Men of Science; Dictionary of International Biography;

Service to Profession

USA Nat' Committee for Crystallography: Chairman, 1979-1981; Member, 1969-74; 1976-79

U.S. Delegation to triennial General Assembly of the International Union of Crystallography: Member, 1975, 1978; Chairman, 1981

American Crystallographic Association: President 1973; Vice President 1972; Treasurer 1968-1971

Governing Board, American Institute of Physics: Member 1975 1981

Journal of Applied Crystallography (Int): Editor 1970- 1978; Coeditor 1967-9

Organizing and first chmn, IUCr Commission on Powder Diffraction 1986-1993

International Association for Dental Research

Committee on Groups and Group Chapters, 1973-1975

Organizing Committee for Mineralized Tissue Group (principal role), 1974

Chairman, MTG Program Committee, 1974-1975

MTG Chapter, president-elect and program chairman 1980, president 1981

Academic organizer and teacher in the Summer School for Beginners with the Rietveld Method, August 1990, 1992 Cieszyn, Poland; LaPlata, Argentina and Sao Paulo, Brazil 1992; Moscow, Russia 1995; Sept. 1997, Wislaw, Poland

Int Scientific Program Committees: 2nd Int Conference on Phosphorus Compounds, 1980; 12th IUCr Congress of Crystallography, Ottawa, 1981; many international topical meetings and national meetings; others.

International Advisor to the Organizing Committee for the "Third International School of Crystallography: X-Ray Powder Diffraction and Its Applications", Cairo, Egypt, 14-22 January 1990 and the fourth, January 1993. Cairo

Chairman of PRT for the High Resolution Neutron Powder Diffractometer at the Brookhaven National Laboratory, 1989-1994

Organizing chairman or co-chairman of several international scientific conferences, symposia, etc.; Invited speaker at dozen of scientific meetings

Int Center for Diffraction Data: Member 1990-, Vice-Chairman 1996

Honors and Awards:

Docteur Honoris Causa, Institut National Polytechnique de Toulouse (Univ. de Toulouse IV) 1979

Elected Foreign Member, Polish Academy of Sciences 1991

Memberships and Committees:

Foreign Member, Polish Academy of Sciences

Fellow: Institute of Physics and Physical Society (U.K.)

Fellow: American Physical Society

American Crystallographic Association

Materials Research Society

JCPDS-ICDD

Association Francaise de Cristallographie

Publications:

Books

Physics of X-ray Diffraction, L.V. Azaroff (ed.), R. Kaplow, N. Kato, R.J. Weiss, A.J.C. Wilson and R.A. Young, McGraw-Hill Book Co. (1974).

The Rietveld Method, R. A. Young, Ed., Oxford University Press (1993). (also author of Chapter 1: "Introduction to the Rietveld Method", pp. 1 - 38.)

Other Publications

"Propagation of Some Systematic Errors in X-ray Line Profile Analysis", R.A. Young, R.J. Gerdes and A.J.C. Wilson, Acta Cryst., 22, 155-162, (1967).

"Neutron Diffraction Studies of Human Tooth Enamel," R.A. Young and Stephen Spooner, Arch. Oral Biol., 15, 47-63 (1969).

* "Application of the Pattern-Fitting-Structure Refinement Method to X-ray Powder Diffractometer Patterns", R.A. Young, P.E. Mackie and R.B.VonDreele, J. Appl. Cryst., 10, 262-269 (1977).

"Crystallography of Human Tooth Enamel: Initial Structure Refinement", P.E. Mackie and R. A. Young, Mat. Res.-Bull., 15, 17-29 (1980).

"Application of the Rietveld Whole-Pattern-Fitting Method to Linear Polymer Structure Analysis," R. A. Young, J. L. Lundberg and A. Immirzi, ACS Symposium Series, 141, 69-91 (1980).

- "Reversible High Temperature Exchange of Carbonate and Hydroxyl Ions in Tooth Enamel and Synthetic Hydroxyapatite," RA Young, MC Bartlett, S Spooner, PE Mackie and G Bonel, *J. Biological Physics*, 9, 1-34 (1981).
- "New Computer Program for Rietveld Analysis of X-Ray Powder Diffraction Patterns," D. B. Wiles and R. A. Young, *J. Appl. Cryst.*, 14, 149-151 (1981).
- "Application of the Rietveld Method for Structure Refinement with Powder Diffraction Data," R. A. Young and D. B. Wiles, *Advances in X-ray Analysis*, 24, 1-23 (1981).
- "Profile Shape Functions in Rietveld Refinements," R.A. Young and D.B. Wiles, *J. Appl. Cryst.*, 15, 430-438 (1982).
- "Variability of Hydroxyapatite Preparations," R. A. Young and D.W. Holcomb, *Calcif.-Tiss. Int?*?, 34, S17-S32 (1982).
- "Atom Positions in Highly Ordered Kaolinite," P. R. Suitch and R. A. Young, *Clays and Clay Minerals*, 31, 337-366 (1983).
- "The Structural Location and Role of Mn²⁺ Partially Substituted for Ca²⁺ in Fluorapatite," P. R. Suitch, J. L. LaCout, A. Hewat and R. A. Young, *Acta Cryst.*, B41, 173-179 (1985).
- "OH⁻Dipole Reorientability in Hydroxyapatites: Effect of Tunnel Size," N. Hitmi, C. LaCabanne, R.A.Young, *J. Phys. Chem. Solids*, 47, 533-546 (1986)
- "Application of the Rietveld Crystal Structure Refinement Method to Cellotetraose", A.Sakthivel, A. D. French, B. Eckhardt, and R. A.Young, ACS Symposium Series, 340, THE STRUCTURES OF CELLULOSE, Characterization of the Solid States, R. Atalla, Ed., American Chemical Society, Washington, DC. (1987) pp. 68 -87.
- "Etude Structurale de Ca₂Pb(VO₄)₂, haute pression." Paul Roux, Dag Noreus, Per- Erik Werner, Gilbert Bonel, and Ray Young, *C.R. Acad. Sci. Paris*, 303(II), 803 - 805 (1987)
- "OH⁻ Reorientability in Hydroxyapatites: Effect of F and Cl", N.Hitmi, C. Lacabanne, and R.A. Young, *J. Phys Chem. Solids*, 49, 541-550 (1988).
- "Pressing the Limits of Rietveld Refinement", R. A. Young, *Australian J. Physics*, 41, 297-310 (1988).
- "Verification of the Triclinic Structure of Kaolinite". R. A. Young and A. Hewat, *Clays & Clay Minerals*, 36, 225-232 (1988).
- "Bimodal Profile-Broadening Distributions and Rietveld Refinements", R. A. Young and A. Sakthivel, *J. Appl. Cryst.*, 21, 416-425 (1988).
- "Crystallite Size and Microstrain Indicators in Rietveld Refinement", R. A. Young and P. Desai, *Archiwum Nauki o Materialach (Archives of Materials Science)*, 10, 71-90 (1989).
- "Determination of the Antimony Substitution Site in Calcium Fluorapatite from Powder X-Ray Diffraction Data", Barry G. DeBoer, A. Sakthivel, J. R. Cagle and R. A. Young, *Acta Crystallographica*, B47, 683-692 (1991).
- "X-ray Rietveld Structure Refinement of Ca, Sr, and Ba Meta-Antimonates", B. G. DeBoer, R. A. Young, and A. Sakthivel, *Acta Crystallographica*, C50, 476-482 (1994).
- "An analysis of preferred orientation in Yba₂Cu₃O_{7-x}superconducting films deposited by CVD on single-crystal and polycrystalline substrates." E. A. Judson, D. N. Hill, R. A. Young, J. R. Cagle, W. I. Lackey, W. B. Carter, and E. K. Barefield, *Powder Diffraction*, 9, 250-259 (1995).
- "DBWS-9411 - an upgrade of the DBWS*.* programs for Rietveld refinement with PC and mainframe computers", R. A. Young, A. Sakthivel, T. S. Moss, and C. O. Paiva-Santos, *J. Appl. Cryst.*, 28, 366-7 (1995).
- "Investigation of (Sr,Ca)₄PtO₆, Using Rietveld Refinement", W. Wong-Ng, J. A. Kaduk, R. A.Young, F. Jiang, L. J. Swartzendntber and H. J. Brown, *Powder Diffraction* (in press, 1999).
- "Relationships between CAP MES, crystallite size and microstrain parameters.", Arif A. Baig, Jeffrey L. Fox, R. A. Young, Zeren Wang, Jer Hsu, William I Higuchi, Anil Chhetry and Mokoto Otsuka, *Calcified Tissue International*, (in press, 1999).

"Analysis of Antimony-Tin Based Skutterudites S. B. Schujman, G. A. Slack, H.C.Nguyen, G.S. Nolas, R. A. Young, F. Mohammed and T. Tritt, Thermoelectric Materials 1998 The next Generation of materials for Small Scale Refrigeration and Power generation, Eds, T. M. Tritt, H. B. Lyon, G. Mahan, and M. G Kanatzides, Materials Research Society (in press, 1999)