

Argonne National Laboratory
Biosciences Division
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Argonne, IL 60439
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Employment History and Education

Argonne National Laboratory, technical staff member, 1996-present at APS, current grade 708

Argonne National Laboratory, technical staff member, stationed at NSLS, 1991-1996

EG&G/Energy Measurements, scientific specialist, stationed at NSLS, 1985-1991

Postdoctoral Fellow, Los Alamos National Laboratory, 1982-1985

Ph.D. in Chemistry, University of Missouri-Rolla, May, 1982.

Dissertation Title: "Design and performance of a γ -ray diffractometer at 0.12Å";

Research assistant at Missouri University Research Reactor (MURR) facility, Columbia, MO, 1977-1982

Chemistry laboratory teaching assistant University of Missouri-Rolla, 1975-1977

B.A. in Chemistry, Texas A&M University, 1975, Cum Laude

Recent Research Highlights

- Characterize commercial protein crystal mounting loops for rigidity
- Investigate the extent of radiation damage in protein crystals using a refractive lens micro-beam
- Characterize a liquid nitrogen cold-stream and its impact on protein crystallography sample motion
- Characterize a power-over-ethernet single channel electrometer
- Implement a real-time x-ray timing-shutter delay monitor

Honors and Awards

Hurst-Eules-Bedford (Texas) Independent School District, Hall of Fame 2009, Distinguished Trinity Graduate

Argonne National Laboratory Director's Award 2009
Argonne National Laboratory Pace Setter Award 2008

Oxford Cryosystems Inc., Low Temperature Poster Prize: "Is your cold-stream working for you or against you? An in-depth look at temperature and sample motion" by R. W. Alkire, N. E. C. Duke and F. J. Rotella, American Crystallographic Association Meeting, Knoxville, TN, May 30-June 5, 2008, Poster MP200.

Patent No. US 7,162,888 1/16/07: "Robot-based automation system for cryogenic crystal sample mounting", by Shu; Deming, Joachimiak; Andrzej, Preissner; Curt A., Nocher; Daniel, Han; Yufeng, Barraza, Jr.; Juan, Lee; Peter, Lee; Wah-Keat, Cai; Zhonghou, Ginell; Stephan, Alkire; Randy, Schuessler; Robert G..

Patent No. US6,596,994 B1 7/22/03: "Design of a high-precision beam position monitor", by Alkire, Randy W.; Rosenbaum, Gerold; Evans, Gwyndaf. BPM licensed to Oxford-Danfysik (now FMB Oxford) through Argonne National Laboratory.

Argonne National Laboratory Pace Setter Award 2003
Argonne National Laboratory Pace Setter Award 2000

First recipient of Distinguished Alumni Award, Trinity High School, Eules, Texas, May, 1984.

Extra-Curricular Service

APS Users Organization steering committee member 1997-2000
NSLS Vacuum committee, 1988-1996
NSLS Users Executive Committee, X-ray Diffraction SIG Representative, 1993, 1994
NSLS Scientific Program Support Committee Co-chairman, 1991-1992
NSLS Space Allocation committee, 1987-1992
NSLS Annual User Meeting organizing committee 1991, 1992

Other

Develop playing card game *Crazy Rummy*[®]; marketed for sale via United States Playing Card Co. 1998-2000.

Publications

- “Diagnostic Tools used in the Calibration and Verification of Protein Crystallography Synchrotron Beam Lines and Apparatus”, F. J. Rotella, R. W. Alkire, N. E. C. Duke and M. J. Molitsky, The 16th Pan-American Synchrotron Radiation Instrumentation Conference, Chicago IL, Nucl. Instr. and Meth. A 649, pp. 228-230 (2011).
- “On axis viewing: Sample visualization along the synchrotron X-ray beam”, K. J. Gofron, M. Molitsky, R. W. Alkire and A. Joachimiak, The 16th Pan-American Synchrotron Radiation Instrumentation Conference, Chicago IL, Nucl. Instr. and Meth. A 649, pp. 109-111 (2011).
- “A new mini-beam device for protein crystallography”, R.W.Alkire, M. Molitsky, F. J. Rotella, K. Lazarski, A. Joachimiak, The 16th Pan-American Synchrotron Radiation Instrumentation Conference, Chicago IL, Nucl. Instr. and Meth. A 649, pp. 112-113 (2011).
- "Spatial dependence and mitigation of macromolecular crystallography radiation damage by line-focus mini-beam", Yanhui Zou, Ed Stern, Yizhak Yacoby, R. W. Alkire, Kenneth Evans-Lutterodt, Aaron Stein, Abdel F. Isakovic, Joshua J. Kas and Andrzej Joachimiak, *Acta Crystallographica*, **D66**, pp. 1287-1294 (2010).
- "Is your cold-stream working for you or against you? An in-depth look at temperature and sample motion", R. W. Alkire, N. E. C. Duke and F. J. Rotella, *J. Appl. Cryst.*, **41**, pp.1122-1133 (2008).
- "Triclinic Lysozyme at 0.65 Å Resolution", Wang, J., Dauter, M., Alkire, R., Joachimiak, A., Dauter, Z., *Acta Crystallographica*, **D63**, pp. 1254-1268 (2007).
- "Development of a real-time timing-shutter performance monitor for protein crystallography", R. W. Alkire, Michael Molitsky, F. J. Rotella, N. E. C. Duke, Patrick M. De Lurgio, John Lee and Tim Madden, *J. Synchrotron Rad.* **13**, pp. 408-410 (2006).
- “The Structural Biology Center 19ID undulator beam line: Facility specifications and protein crystallographic results”, Gerd Rosenbaum, Randy W. Alkire, Gwyndaf Evans, Frank J. Rotella, Krzysztof Lazarski, Rong-Guang Zhang, Stephan L. Ginell, Norma Duke, Istvan Naday, Jack Lazarz, Michael J. Molitsky, Lisa Keefe, John Gonczy, Larry Rock, Ruslan Sanishvili, Martin A. Walsh, Edwin Westbrook and Andrzej Joachimiak, *J. Synchrotron Rad.* **13**, pp. 30-45 (2006).
- “Re-thinking the role of the beam stop at a synchrotron-based protein crystallography beamline”, R. W. Alkire, R. Schuessler, F. J. Rotella, J. D. Gonczy and G. Rosenbaum, *J. Appl. Cryst.*, **37**, pp. 836-840 (2004).
- “Design and development of a robot-based automation system for cryogenic crystal sample mounting at the Advanced Photon Source”, D. Shu, C. Preissner, D. Nocher, Y. Han, J.

Barraza, P. Lee, W-K. Lee, Z. Cai, S. Ginell, R. Alkire, K. Lazarski, R. Schuessler, and A. Joachimiak, Eighth International Conference on Synchrotron Radiation Instrumentation, San Francisco, CA, AIP Conference Proceedings 705, pp. 1201-1204 (2004).

- “Software controls for automated feedback tuning”, K. Lazarski, R. W. Alkire, N. E. C. Duke and F. J. Rotella, Eighth International Conference on Synchrotron Radiation Instrumentation, San Francisco, CA, AIP Conference Proceedings 705, pp. 612-615 (2004).
- “Setting the twist of a sagittally bent crystal using a beam position monitor”, R. W. Alkire, N. E. C. Duke and F. J. Rotella, Eighth International Conference on Synchrotron Radiation Instrumentation, San Francisco, CA, AIP Conference Proceedings 705, pp. 827-830 (2004).
- “Argonne Beam Position Monitor Manual”, ANL-PB-99-085, created for IR100 award submission, copyright registered April 24, 2003.
- "High-precision positioning mechanism development at the Advanced Photon Source", Shu D, Toellner TS, Alp EE, Maser J, Mancini D, Lai B, McNulty I, Joachimiak A, Lee P, Lee W-K, Cai Z, Lee S-H, Han Y, Preissner C, Ginell S, Alkire R, Schuessler R., 2nd International Workshop on Mechanical Engineering Design of Synchrotron Radiation Equipment and Instrumentation (MEDSI02) ANL, (MEDSI02), pp.214 - 222, (2003)
- “Crystal Structure of Bacillus subtilis IolI Shows Endonuclease IV Fold With Altered Zn Binding”, R.-G. Zhang, I. Dementieva, N. Duke, F. Collart, E. Quaiter-Randall, R. Alkire, L. Dieckman, N. Maltsev, O. Korolev and A. Joachimiak, Proteins: Structure, Function, and Genetics, 48:423-426 (2002).
- Crystal structure of the global regulator FlhD from Escherichia coli at 1.8Å resolution, Andrés Campos, Rongguang Zhang, Randall W. Alkire, Phillip Matsumura and Edwin M. Westbrook, Molecular Microbiology, 39(3), pp.567-580 (2001).
- “Design of a vacuum compatible, high-precision, monochromatic beam position monitor for use with synchrotron radiation from 5-25keV”, R. W. Alkire, Gerold Rosenbaum and G. Evans, Journal of Synchrotron Radiation, 7, pp. 61-68 (2000).
- “Amorphous silicon, semiconductor X-ray converter detectors for protein crystallography”, S. Ross, G. Zentai, K. S. Shah, R. W. Alkire, I. Naday and E. M. Westbrook, Nucl. Instr. and Meth., A399, pp.38-50 (1997).
- "An incident beam monitor for use with high speed protein crystallography at a synchrotron source", R. W. Alkire and F. J. Rotella, J. Appl. Cryst, 30, pp. 1-6 (1997).
- "Performance of beamline X8C at the NSLS", R. W. Alkire, M. Sagurton, F. D. Michaud, W. J. Trela, R. J. Bartlett and R. Rothe, Nucl. Instr. and Meth., A352, pp.535-541 (1995).
- "The X8C dual wire beam position monitor", R. W. Alkire, E. P. Sullivan, F. D. Michaud, W. J. Trela, R. J. Bartlett, Nucl. Instr. and Meth., A350, pp.13-16 (1994).

- "An x-ray beamline for the energy range 5-20 keV", W. J. Trela, R. J. Bartlett, F. D. Michaud, and R. W. Alkire, Nucl. Instr. and Meth., A266, pp. 234-237 (1988).
- "Characteristics and performance of the Los Alamos VUV beamline at the NSLS", R. J. Bartlett, W. J. Trela, F. D. Michaud, S. H. Southworth, R. W. Alkire, P. Roy, N. Shinn, Nucl. Instr. and Meth., A266, pp. 199-204 (1988).
- "VUV-soft x-ray beam line for spectroscopy and calibration", R. J. Bartlett, W. J. Trela, F. D. Michaud, S. H. Southworth, R. Rothe, and R. W. Alkire, SPIE, Vol. 689, pp. 200-207 (1986).
- "Progress report on single crystal high-pressure structure analysis using neutron diffraction time-of-flight techniques at the WNR: Investigation of Al_2O_3 and Tl_3PSe_4 Near 15 kbar", R. W. Alkire, Allen C. Larson and Phillip J. Vergamini, Los Alamos National Laboratory general report, LAUR-85-2788, (1985).
- "The structures of Trithallium-tetraselenophosphate, Tl_3PSe_4 , and Trithallium-tetrathioarsenate, Tl_3AsS_4 , at 65K", R. W. Alkire, Allen C. Larson, Phillip J. Vergamini and B. Morosin, Acta Cryst. C, pp. 1709-1714 (1985).
- "High-pressure single crystal neutron diffraction (to 20 kbar) using a pulsed source: Preliminary investigation of Tl_3PSe_4 ", R. W. Alkire, Allen C. Larson, Phillip J. Vergamini, J. E. Schirber, and B. Morosin, J. Appl. Cryst. 18, pp. 145-149 (1985).
- "Structure of ReO_3 above the 'compressibility collapse' transition", J. E. Schirber, B. Morosin, R. W. Alkire, Allen C. Larson, and Phillip J. Vergamini, Phys. Rev. B, Vol. 29, No.7, pp. 4150-4152 (1984).
- "Trithallium-tetraselenophosphate (Tl_3PSe_4) and Trithallium-tetrathioarsenate (Tl_3AsS_4) by neutron time-of-flight diffraction", R. W. Alkire, Phillip J. Vergamini, Allen C. Larson, and B. Morosin, Acta Cryst. C 40, pp. 1502-1506 (1984).
- "Fabrication of HgI_2 nuclear radiation detectors by machine cleaving", A. Levi, A. Burger, M. Schieber, L. Van den Berg, W. B. Yelon, and R. W. Alkire, Nucl. Instr. and Meth. 213, pp. 31-33 (1983).
- "Determination of the absolute structure factor for the forbidden (222) reflection in silicon using 0.12\AA γ -rays", R. W. Alkire, W. B. Yelon and J. R. Schneider, Phys. Rev. B 26, pp. 3097-3104 (1982).
- "Design and performance of a γ -ray diffractometer at 0.12\AA ", R. W. Alkire and W. B. Yelon, J. Appl. Cryst. 14, pp. 362-369 (1981).
- "Crystal perfection of HgI_2 studied by neutron and γ -ray diffraction", W. B. Yelon, R. W. Alkire, M. M. Schieber, L. Van den Berg, S. E. Rasmussen, H. Christensen and J. R. Schneider, J. Appl. Phys. 52(7), pp. 4604-4609 (1981).

- "The University of Missouri γ -ray scattering facility", W. B. Yelon, R. W. Alkire and G. Schupp, Nucl. Instr. and Meth. 166, pp. 39-43 (1979).