John Francis Ankner, PhD

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PROFESSIONAL EXPERIENCE:

Oak Ridge National Laboratory – Oak Ridge, TN
Senior Research Scientist, 08/2006 - present

Beamline scientist for the Liquids Reflectometer (LR) at the Spallation Neutron Source (SNS)

- Developed and maintain a strong collaborative research program using the LR
- Oversaw and served as technical lead for several generations of data acquisition and reduction software upgrades and a major hardware upgrade
- Troubleshot, diagnosed, and helped mitigate LR technical issues, such as water blockage of beam tube
- Initiated LR user program and maintained it over time in collaboration with other beamline staff members
- Developed Excel-based reflectivity analysis code for users (and self)
- Derived formalism for and guided development of LR data reduction software, wrote the first version, and guided it through three major upgrades and deployments
- Guided application of two generations of data acquisition system software and initial development of a graphical user interface for use at the LR
- Oversaw commissioning of the newly built LR

Oak Ridge National Laboratory – Lemont, IL and Oak Ridge, TN
Research Scientist, 07/1998 - 08/2006

Technical lead scientist for the design and construction of the Liquids Reflectometer (LR) at the Spallation Neutron Source (SNS)

- Conducted workshops and drummed up interest at conferences to develop the user base for the future LR
- Served as scientific technical lead overseeing the procurement and construction schedule of the LR, which was delivered on time and at budget
- Conceived, implemented, and deployed into code analytical methods for simulating neutron guides and choppers and used those codes to develop a detailed, dimensioned LR concept for the engineers and designers to flesh out
- Proposed the partition of the SNS monolith into narrow and wide shutters to accommodate two reflectometers (the LR and the bonus Magnetism Reflectometer) on Beamline 4. Applied to the entire monolith, this idea increased the number of potential instruments at SNS by 33%.
- Developed conceptual design of a horizontal-surface reflectometer for SNS that eventually became the Liquids Reflectometer (LR)

Missouri University Research Reactor – Columbia, MO
Research Scientist, 09/1993 - 06/1998

Researcher working on commissioning and development of scientific program for the Missouri University Research Reactor (MURR) reflectometer

- Developed and maintained a strong collaborative research program in both hard and soft matter using MURR reflectometer
- Developed and deployed FORTRAN-based data reduction and analysis code (based on NIST code) for users (and self)

PERSONAL PROFILE

Three decades:

- Working in neutron reflectivity, developing instrument simulation, data acquisition, reduction, and analysis software
- Designing, working within, and overseeing diverse teams constructing instruments
- Initiating, developing, and running collaborative research programs
- Studying a wide range of topics, including polymer physics, biomembranes, and magnetic films
- Applying computational methods to comprehend the richness of behavior in these systems and how it may be revealed using scattering methods

EDUCATION

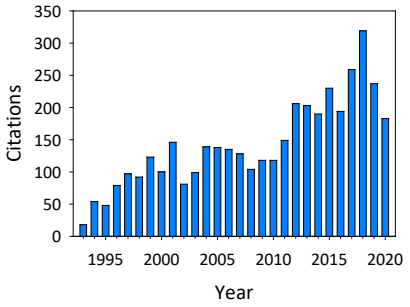
- Ph.D. Physics, 1990,
- M.S. Physics, 1984,
  U. of Illinois at Urbana Champaign
- A.B. Physics, 1983,
  Cornell University

PROFESSIONAL SOCIETIES

- American Physical Society (APS)
- Materials Research Society (MRS)
- Neutron Scattering Society of America (NSSA)

IMPACT

- H-index of 33
- Over 4000 citations



- Developed and deployed polarization and analysis capability for studies of magnetic thin films
- Helped commission newly constructed vertical-surface reflectometer

National Institute of Standards and Technology – Gaithersburg, MD
Postdoctoral Researcher, 03/1990 - 08/1993

Postdoctoral researcher working on commissioning and development of scientific program for the NIST BT-7 reflectometer

- Helped initiate and maintain a strong collaborative research program using polarized neutron reflectivity to study magnetic films
- Developed and deployed neutron reflectivity analysis code for both polarized and unpolarized measurements (mlayer) that, subsequently modified, served for many years as the bones of the reduction and analysis packages for the facility
- Adapted and developed FORTRAN-based reduction code for neutron reflectivity data
- Participated in the commissioning of the BT-7 vertical-surface reflectometer, the first dedicated reflectometer at NIST

COMMUNITY SERVICE

- Local Contact for LR experiments at SNS since 2006 and have supported user experiments at SNS, MURR, and NIST since 1990
- Instructor at numerous neutron scattering schools, including the NSF Neutron and Xray School (NXS, 2008-present) and Neutrons in Biology (now called HANDS, 2010-present)
- Member of International Organizing Committee of the Surface X-ray and Neutron Scattering (SXNS) Conference series (2002-present); Co-organizer of 2002 conference in Lake Tahoe, CA
- Member of European Spallation Source Scientific and Reflectometer Technical Advisory Committee (2011-2018)
- Reviewer for ACS, AIP, RSC, and other journals

PUBLICATIONS

1. R. Kumar, et al., Capacitance of thin films containing polymerized ionic liquids, Science Advances 6, eaba7952 (2020).
2. V. Kozlovskaya, et al., Architecture of Hydrated Multilayer Poly (methacrylic acid) Hydrogels: Effect of solution pH, ACS Applied Polymer Materials 2, 2260 (2020).
3. M.D. Phan, et al, X-ray and neutron reflectivity studies of styrene-maleic acid copolymer interactions with galactolipid-containing monolayers, Langmuir 36, 3970 (2020).
4. R. Hlushko, J.F. Ankner, and S.A. Sukhishvili, Layer-by-Layer Hydrogen-Bonded Antioxidant Films of Linear Synthetic Polyphenols, Macromolecules 53, 1033 (2020).
5. J.Y.Y. Lin, Recent developments of MCViNE and its applications at SNS, J. of Physics Communications 3, 085005 (2019).
6. V. Selin, A. Aliakseyeu, J.F. Ankner, and S.A. Suknishvili, Effect of a Competitive Solvent on Binding Enthalpy and Chain Intermixing in Hydrogen-Bonded Layer-by-Layer Films, Macromolecules 52, 4432 (2019).
7. F.A. Adlmann, et al., Normalization of stroboscopic neutron scattering experiments, Nucl. Instr. and Methods in Phys. Res. B 434, 61 (2018).
8. A. Korolkovas, et al., Shear deformation of low-density polymer brushes in a good solvent, Phys. Rev. E 98, 032501 (2018).
9. A.J. Erwin, et al., Tunable Compartmentalized Morphologies of Multilayered Dual Responsive Star Block Polyampholytes, Macromolecules 51, 4800 (2018).
10. V. Selin, et al., Biocompatible nanocoatings of fluorinated polyphosphazenes through aqueous assembly, ACS Applied Materials & Interfaces 10, 9756 (2018).
11. V. Selin, J.F. Ankner, and S.A. Sukhishvili, Biocompatible nanocoatings of fluorinated polyphosphazenes through aqueous assembly, Gels 4, 7 (2018).
12. Y.E. Ghoussoub, et al., Ion distribution in dry polyelectrolyte multilayers: a neutron reflectometry study, Soft Matter 14, 1699 (2018).
13. V. Selin, J.F. Ankner, and S.A. Sukhishvili, Nonlinear layer-by-layer films: effects of chain diffusivity on film structure and swelling, Macromolecules 50, 6192 (2017).
14. B. Aden, et al., Assessing chemical transformation of reactive, interfacial thin films made of end-tethered poly (2-vinyl-4, 4-dimethyl azlactone)(PVDMA) chains, Macromolecules 50, 618 (2017).
15. F.A. Adlmann, et al., Överlåtaren: a fast way to transfer and orthogonalize two-dimensional off-specular reflectivity data, J. Appl. Crystallogr. 49, 2091 (2016).
16. W. Higgins, et al., Stratified Temperature-Responsive Multilayer Hydrogels of Poly(N-vinylpyrrolidone) and Poly(N-vinylcaprolactam): Effect of Hydrogel Architecture on Properties, Macromolecules 49, 6953 (2016).
17. J.M.Y. Carillo, et al., Petascale simulations of the morphology and the molecular interface of bulk heterojunctions, ACS Nano 10, 7008 (2016).
18. C. Ye, et al., Bimorph silk microsheets with programmable actuating behavior: experimental analysis and computer simulations, ACS Applied Materials & Interfaces 8, 17694 (2016).
19. S.G. Youm, Polythiophene thin films by surface-initiated polymerization: mechanistic and structural studies, Chemistry of Materials 28, 4787 (2016).
20. S. Desseaux, et al., Swelling Behavior and Nanomechanical Properties of (Peptide-Modified) Poly (2-hydroxyethyl methacrylate) and Poly (poly (ethylene glycol) methacrylate) Brushes, Macromolecules 49, 4609 (2016).
21. J.P. Mahalik, Monomer volume fraction profiles in pH responsive planar polyelectrolyte brushes, J. Polymer Sci. B: Polymer Physics 54, 956 (2016).
22. V. Kozlovskaya, O. Zavgorodnya, J.F. Ankner, and E. Kharlampieva, Controlling internal organization of multilayer poly (methacrylic acid) hydrogels with polymer molecular weight, Macromolecules 48, 8585 (2015).
23. V. Selin, J.F. Ankner, and S.A. Sukhishvili, Diffusional response of layer-by-layer assembled polyelectrolyte chains to salt annealing, Macromolecules 48, 3983 (2015).
24. M. Zhernenkov, et al. Thermoresponsive PNIPAM coatings on nanostructured gratings for cell alignment and release, ACS Applied Materials & Interfaces 7, 11857 (2015).
25. A. Zhuk, et al., Chain conformation and dynamics in spin-assisted weak polyelectrolyte multilayers, Langmuir 31, 3889 (2015).
26. F.A. Adlmann, et al., Towards neutron scattering experiments with sub-millisecond time resolution, J. Appl. Crystallogr. 48, 220 (2015).
27. R. Kumar, et al., Microphase separation in thin films of lamellar forming polydisperse di-block copolymers, RSC Advances 5, 21336 (2015).
28. I. Mitra, et al., Thin film phase behavior of bottlebrush/linear polymer blends, Macromolecules 47, 5269 (2014).
29. M. Wolff, et al., Combined neutron reflectometry and rheology, J. Appl. Crystallogr. 46, 1729 (2013).
30. E. Hellstrand, et al., Adsorption of α-synuclein to supported lipid bilayers: positioning and role of electrostatics, ACS Chemical Neuroscience 4, 1339 (2013).
31. L. Xu, Molecular weight dependence of polymer chain mobility within multilayer films, ACS Macro Letters 2, 865 (2013).
32. C. Deodhar, et al., Hydration in weak polyelectrolyte brushes, ACS Macro Letters 2, 398 (2013).

33. J.F. Ankner, et al., Neutron scattering techniques and applications in structural biology, Current Protocols in Protein Science 72, 1 (2013).
34. V. Kozlovskaya, et al., Tailoring architecture of nanothin hydrogels: effect of layering on pH-triggered swelling, ACS Macro Letters 2, 226 (2013).
35. A. Zhuk, L. Xu, J.F. Ankner, and S.A. Sukhishvili, Selective water uptake within micelle-containing layer-by-layer films of various architectures: a neutron reflectometry study, Soft Matter 9, 410 (2013).
36. J. Pan, et al., Time-of-flight Bragg scattering from aligned stacks of lipid bilayers using the Liquids Reflectometer at the Spallation Neutron Source, J. Appl. Crystallogr. 45, 1219 (2012).
37. B.S. Lokitz, et al., Manipulating Interfaces through Surface Confinement of Poly(glycidyl methacrylate)-block-poly(vinyldimethylazlactone), a Dually Reactive Block Copolymer, Macromolecules 45, 6438 (2012).
38. B. Wallet, et al., Silk layering as studied with neutron reflectivity, Langmuir 28, 11481 (2012).
39. L. Xu, et al., Linear versus exponential growth of weak polyelectrolyte multilayers: Correlation with polyelectrolyte complexes, Macromolecules 45, 3892 (2012).
40. E. Chung, et al., Interaction of silica nanoparticles with a flat silica surface through neutron reflectometry, Env. Sci. & Technology 46, 4532 (2012).
41. J.R. Carmichael, High-pressure cell for neutron reflectometry of supercritical and subcritical fluids at solid interfaces, Rev. Sci. Instrum. 83, 045108 (2012).
42. S.M. Kilbey II and J.F. Ankner, Neutron reflectivity as a tool to understand polyelectrolyte brushes, Current Opinion in Colloid & Interface Science 17, 83 (2012).
43. L. Xu, et al., Anisotropic diffusion of polyelectrolyte chains within multilayer films, ACS Macro Letters 1, 127 (2012).
44. J. Alonzo, et al., Assembly and Characterization of Well-Defined High-Molecular-Weight Poly(p-phenylene) Polymer Brushes, Chemistry of Materials 23, 4367 (2011).
45. L. Xu, J.F. Ankner, and S.A. Sukhishvili, Steric effects in ionic pairing and polyelectrolyte interdiffusion within multilayered films: a neutron reflectometry study, Macromolecules 44, 6518 (2011).
46. G. Cheng, et al., Neutron reflectometry and QCM-D study of the interaction of cellulases with films of amorphous cellulose, Biomacromolecules 12, 2216 (2011).
47. E. Soto-Cantu, Versatility of alkyne-modified poly (glycidyl methacrylate) layers for click reactions, Langmuir 27, 5986 (2011).
48. P. Guttfreund, et al., Depletion at solid/liquid interfaces: Flowing hexadecane on functionalized surfaces, J. Chem. Phys. 134, 064711 (2011).
49. V. Kozlovskaya, et al., Localized entrapment of green fluorescent protein within nanostructured polymer films, Soft Matter 7, 11453 (2011).
50. A. Johs, et al., Characterization of the decaheme c-type cytochrome OmcA in solution and on hematite surfaces by small angle x-ray scattering and neutron reflectometry, Biophys. J. 98, 3035 (2010).
51. T.L. Van Vuure, et al., First measurements of the inclined boron layer thermal-neutron detector for reflectometry, IEEE Trans. on Nucl. Sci. 57, 323 (2010).
52. E. Kharlampieva, et al., Spin-assisted layer-by-layer assembly: variation of stratification as studied with neutron reflectivity, Langmuir 25, 14017 (2009).
53. B.S. Lokitz, et al., Dilute solution properties and surface attachment of RAFT polymerized 2-vinyl-4, 4-dimethyl azlactone (VDMA), Macromolecules 42, 9018 (2009).
54. V.V. Nagarkar, et al., Time-resolved high resolution neutron imaging studies at the ORNL spallation neutron source, IEEE Transactions on Nucl. Sci. 56, 2493 (2009).
55. B.S. Lokitz, et al., Controlled RAFT Polymerization of 2-Vinyl-4, 4-Dimethylazlactone (VDMA): A Facile Route to Bio-Inspired Polymer Surfaces, Macromolecules 42, 9018 (2009).
56. Y. Mo, et al., Detergent-associated solution conformations of helical and β-barrel membrane proteins, J. Phys. Chem. B 112, 13349 (2009)
57. E. Kharlampieva, V. Kozlovskaya, J.F. Ankner, and S.A. Sukhishvili, Hydrogen-bonded polymer multilayers probed by neutron reflectivity, Langmuir 24, 11346 (2008).
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68. J.F. Ankner and G.P. Felcher, Polarized-neutron reflectometry, J. Magn. Magn. Mater. 200, 741 (1999).
69. S.W. Han, et al., Spin-polarized neutron reflectivity: A probe of vortices in thin-film superconductors, Phys. Rev. B 59, 14692 (1999).
70. R. Levicky, et al., Selectively swollen films of triblock/diblock copolymer blends: Dependence of swollen film structure on blend composition, Macromolecules 31, 4908 (1998).
71. N. Koneripalli, et al., Ordering in blends of diblock copolymers, Macromolecules 31, 3498 (1998).
72. D.G. Walton, et al., Creation of stable poly (ethylene oxide) surfaces on poly (methyl methacrylate) using blends of branched and linear polymers, Macromolecules 30, 6947 (1997).
73. J.A. Borchers, et al., Dependence of the interlayer coupling on anneal temperature in Ni–Fe/Cu evaporated multilayers, J. Appl. Phys. 81, 3771 (1997).
74. J.F. Ankner, et al., Temperature dependence of noncollinear magnetic coupling in Fe/Cr (001) superlattices, J. Appl. Phys. 81, 3765 (1997).
75. N. Koneripalli, et al., Confinement-induced morphological changes in diblock copolymer films, Langmuir 12, 6681 (1996).
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78. G.D. Smith, et al., A Monte Carlo simulation of asymmetric random copolymers at an immiscible interface, Macromolecules 29, 4120 (1996).
79. T.F. Schaub, et al., Surface modification via chain end segregation in polymer blends, Macromolecules 29, 3982 (1996).
80. Y. Feng, et al., Compatibilization of polymer blends by complexation. 2. Kinetics of interfacial mixing, Macromolecules 29, 3918 (1996).
81. J.F. Ankner, et al., Structural, field, and temperature dependence of noncollinear magnetic coupling in Fe/Cr (001) superlattices, J. Appl. Phys. 79, 4775 (1996).
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84. H. Zhang, et al., Diffraction of neutron standing waves in thin films with resonance enhancement, Physica B, Condensed Matter 221, 450 (1996).
85. A. Schreyer, et al., Correlation between non-collinear exchange coupling and interface structure in Fe/Cr (001) superlattices, Physica B: Condensed Matter 221, 366 (1996).
86. R. Kulasekere, et al., Neutron reflectivity measurements of homopolymer interfaces reinforced with random copolymers, Physica B: Condensed Matter 221, 306 (1996).
87. A. Schreyer, et al., Noncollinear and collinear magnetic structures in exchange coupled Fe/Cr (001) superlattices, Phys. Rev. B 52, 16066 (1995).
88. H. Zhang, Grazing-incidence neutron diffraction by thin films with resonance enhancement, Phys. Rev. B 52, 17501 (1995).
89. A. Schreyer, et al., Direct observation of non-collinear spin structures in Fe/Cr (001) superlattices, Europhys. Lett. 32, 595 (1995).
90. D.G. Wiesler, et al., Neutron and X-ray reflectivity study of Ba salts of alternating bilayers of deuterated and hydrogenated stearic acid, Thin Solid Films 266, 69 (1995).
91. S. Krueger, et al., Extending the angular range of neutron reflectivity measurements from planar lipid bilayers: application to a model biological membrane, Langmuir 11, 3218 (1995).
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95. A. Karim, et al., Neutron reflectivity study of the density profile of a model end-grafted polymer brush: influence of solvent quality, Phys. Rev. Lett. 73, 3407 (1994).
96. J.F. Ankner, et al., Polarized neutron reflectivity studies of biquadratic coupling in [Fe/Cr](100) and [Fe/Al](100) superlattices and films, J. Appl. Phys. 76, 7092 (1994).
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study of a Co/Cu superlattice, J. Appl. Phys. 73, 7616 (1993).
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